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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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CW Photo by T. Scannell

Rainy Day Monday . . .

Boxes Draw the Crowds At Biggest NCC to Date

By Connie Winkler
CW Staff

NEW YORK — Rain — shine; empty technical sessions — jammed exhibit areas; hard-sell talk — low-key booths; IBM's sophisticated 4331 — Radio Shack's TRS-80.

It was a study in contrasts here last week at the largest National Computer Conference yet, a conference where little new happened but a lot of people showed up anyway.

More than 80,000 persons attended the four-day show, topping last year's total of 58,240 in Anaheim, Calif.

If NCC had been handing out Tony or Academy Awards, they would have gone to the boxes — it was the hardware in every variety and size that attracted mobs to the four floors of the New York Coliseum and smaller exhibits at the Hilton and Sheraton Centre hotels.

But the meeting rooms at the Hilton and Sheraton remained almost empty. Rooms suitable for 700 held 20 — or less. A crowd of 100 was a sellout, except for the mid-afternoon plenary sessions that drew big audiences.

The first day's rain sent many scurrying for umbrellas, but they held onto their place in the registration lines, which took as long as three hours to maneuver. Once inside the Coliseum, visitors crowded six or seven deep to watch demonstrations, and exhibitors lost their voices.

As could be expected, the established mainframers — all of which were here for the first time in years — saw most of the action, with IBM far and away drawing the biggest crowds.

However, there were few new products on display, with most of the major manufacturers emphasizing existing product lines. The atmosphere, full of hoopla in the past, had sobered, with exhibitors and attendees concentrating

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Panel Cites Snowballing Fear of DP

By Jake Kirchner
CW Washington Bureau

NEW YORK — Almost two-thirds of the American public believes its personal privacy is so threatened that computer use should be drastically curtailed.

According to statistics discussed at a National Computer Conference session here last week, 54% of the general public thinks "present uses of computers are an actual threat to privacy." This and other findings of a recent Louis Harris poll on privacy (see story on Page 35) were outlined by Alan F. Westin, a professor of Public Law and Government at Columbia University.

Westin noted that in 1976, only 34% of Americans felt threatened by computers. Today 63% believe computer use must be "sharply restricted" in the future to protect personal privacy.

Westin, who was an advisor to the survey's sponsor, Sentry Insurance Co., was a member of an NCC panel that discussed "Computers in Society." The panel agreed the public is obviously not convinced the increased efficiency computers offer is worth the concomitant loss in personal privacy.

However, according to Westin, although 43% of the public believes "technology has almost gotten out of control," Americans in general are "not rigid, extremist or Luddites." The average American, he said, is willing to provide personal information if it is relevant to a particular end, but opposes the intrusiveness and expanded government that are part of an information society.

While 60% of those polled by Harris believe computers have improved the quality of life in this country, 80% think "computers make it easier for someone to improperly obtain confidential information on an individual," Westin said.

Because of this "deep-seated fear that computer use is not sufficiently controlled," Westin declared that "we have to look forward to a period of high skepticism on the part of the American public" about advancing technology. That skepticism will be demonstrated during the next decade by a public clamor for more privacy laws.

In addition, the federal government will have a difficult time gaining acceptance for large and complex systems, such as those proposed by the Internal Revenue Service and the Justice Department, according to Westin. He further predicted slow public acceptance of electronic funds transfer systems.

Dr. Carl Hammer, Univac director of computer sciences, told the session attendees the survey illustrates his belief

(Continued on Page 2)

Univac Unwraps IBM 4300 Rival

By a CW Staff Writer

NEW YORK — Univac became the last mainframer to react to the IBM 4300 announcement with the introduction of the 1100/60 system here at the National Computer Conference last week.

While Univac claimed that the announcement was not in reaction to "anything," it did compare the product to the IBM line, claiming the new processors range from slightly below the 4341 in performance up to about the performance levels of the IBM 3032.

The multiprocessor-based system [CW, June 4] comes in four single-processor and two multiprocessor configurations. In addition to the processors, the firm also introduced a communications processor and several peripheral products for the family.

All of the systems are file-expandable and object code-compatible with the other members of the 1100 line. To take full advantage of Extended Instruction Set (EIS) firmware on certain models, however, users will have to recompile some of their programs, Univac admitted.

The central processing unit for the line combines MOS microprocessors with emitter-coupled logic circuitry. The micros are run in parallel for error checking and correction.

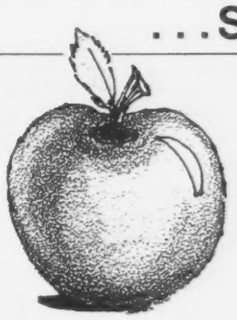
The single processors contain the CPU, an I/O unit and main memory. Main storage, based on 16K-bit chips, starts at 524,288 36-bit words — equivalent to 2M bytes in IBM terms — and is expandable up to 2,097,152 36-bit words (8M bytes) in 262,144-word increments.

The average access time is 575 nsec.

The two largest models in the line — the H1 and H2 — also feature an 8K-word (32K-byte) buffer storage with a 116 nsec access time. These two systems also have multiprocessor versions, with the processors tightly coupled.

The two smaller models — the C1 and C2 — do not have buffer memories or the capability of being multiprocessors or running the EIS, which is said to

(Continued on Page 2)



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. . . Sonny Day Tuesday

CW Photo by A. Dooley

Ten years ago Sonny Monosson sold a Decsystem-10 computer. This year he was back — reselling it.

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Univac Rivals 4300 With 1100/60

(Continued from Page 1)

speed processing time for Cobol-oriented applications and for data base applications.

Compared with its Univac predecessors, the 1100/60 units have about twice the performance of the 1106 at the low end and almost nine times the performance of the 1106 for a two-processor H2, the firm said.

Operating System Unbundled

The 1100/60 systems all use the 1100 operating system, but some functions previously incorporated in the operating system have been broken out as separately priced products, much like IBM did with the announcement of the 4300 series.

In line with this move, Univac also announced that it is now unbundling its education services and its program products, which previously had been included in the hardware price.

The firm also extended the Query Language Processor (QLP 1100) and added the DMS 1100 Data Dictionary and a communication management system.

Another introduction was the Distributed Communications Processor (DCP/40), which can operate as either a front end or remote communications processor. The unit can handle one to 16 I/O processors per system and up to 256 half- or full-duplex lines with speeds of 45M- to 1.3M bit/sec.

The unit accommodates up to 2M bytes of disk storage and features an access time of 300 nsec for read and 450 nsec for write.

When used with the CMS 1100 software and Univac's Telcon software, the system represents the firm's first major implementation of its conceptual Distributed Communications Architecture.

The 8470 disk announced with the system stores up to 500M bytes per drive, offering a 16G-byte capacity for each disk subsystem. The transfer rate is 466,000 word/sec and the average latency is 8.3 msec.

Under a five-year lease, the 1100/60 C1 with 524K words leases for $6,015/mo and the multiprocessor H2 with 1M word (4M bytes) leases for $27,205. Purchase prices are $318,975 and $1,442,075, respectively.

Univac storage upgrades cost $30,475 per 1M byte compared with IBM's $15,000 price tag for the same amount of memory.

Univac estimated that typical software and support charges will range from about $2,000/mo to $5,000/mo under the unbundling scheme.

Deliveries will begin next January.

Growing Fear of DP Cited

(Continued from Page 1)

that "our societal complexity has by far exceeded our ability to cope with it."

Speaking as a "technologist," Hammer said the problem with implementing advanced technology in this country is that society thinks it can make decisions in ignorance. As an example, he noted that U.S. policy on nuclear energy will probably be made by "230 million Americans" with little or no knowledge of the technology involved.

Willis Ware of The Rand Corp. said the Harris survey shows "how really uninformed society is" and "how poorly the public understands the role of information in business and government."

The public wants all the benefits of the cost reductions and the efficiency computers make possible, but is not willing to disclose the personal information necessary to provide those benefits, Ware said. The public must be educated on the importance of personal information to modern business practices, he contended.

In general, the panel agreed the privacy survey merely documented the generally accepted belief that Americans are becoming increasingly concerned by what they perceive to be invasions of their personal privacy. The question now, as voiced by Richard Neustadt, is "what to do about it?"

A member of the White House Domestic Policy Staff, Neustadt noted that economics is not the only area to consider when trying to ensure privacy. Privacy laws also increase bureaucracy — "more rules, more regulations and more red tape," he said.

Outlining the principles of the Carter Administration's privacy stance, he said, "The focus of these policies is to control information, not technology."

Whether or not the computer industry approves of the approach the Administration has taken to privacy — and he warned that a number of additional bills will be proposed this summer — Neustadt noted that the DP industry is critically involved in the issue. He urged the industry to ensure that the issue is debated in Congress.

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We can picture one of those smiling, urbane IBM executives stepping up to the microphone and saying: "And now, ladies and gentlemen, we are pleased to announce that the first lucky winner of a 4300 — with complete decorative trim kit — is . . ."

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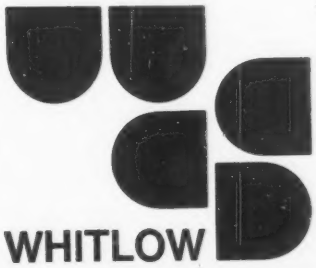

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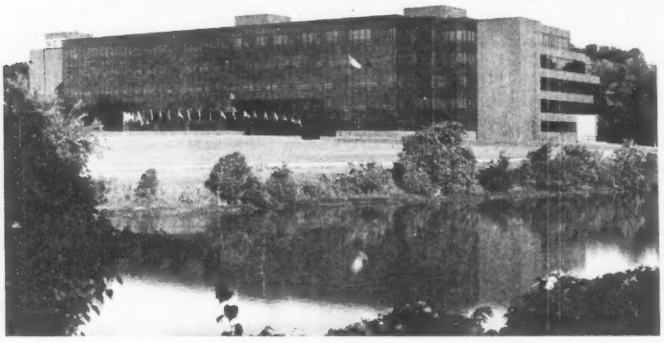

NCR: A Company Making Up for Lost Time

Starting last week with a portrait of Univac, Computerworld *began profiling each of the five companies recognized as IBM's traditional competitors in the general-purpose mainframe market, focusing on where they stand now and how they intend to compete in the 1980s. This week — NCR Corp.; in the weeks ahead, Burroughs Corp., Control Data Corp. and Honeywell, Inc.*

By Marcia Blumenthal
CW Staff

DAYTON, Ohio — Although NCR Corp.'s headquarters — a modern, red-brick building with smoke-colored windows — sits on a man-made island, the company is hardly isolated from the mainstream of today's computer industry.

NCR owes its emerging position in the computer systems market today to Board Chairman William S. Anderson, who in 1972 leapfrogged a bevy of more senior executives to become president and chief executive officer of a wavering firm that had lost $60 million that year.

At the time, NCR had barely committed itself to producing electronic cash registers, let alone complete computer systems. With complete authority to straighten out the company, the tough executive shed the corporate poundage that was slowing NCR's growth. For decades the heavyweight in the mechanical cash register market, NCR was resting on those laurels and failed to see the opportunities presented by electronics.

Although NCR had acquired a computer company early in the game, it never made a real commitment to that end of the business. Its early computers, the Century 100 and 200, introduced in 1968, had technical problems that reportedly cost NCR $150 million.

Anderson saw that NCR would not survive unless it produced a full range of systems to solve users' problems. And with the announcement of the high-end V-8600 series last November, Anderson's goal of making NCR a full-range system supplier was realized. NCR's problems have been relegated to history.

In fact, Charles E. Exley Jr., NCR president, is impatient with those who dwell on NCR's past. Pirated away from Burroughs Corp. in 1976 by Anderson, who is now NCR's chairman, Exley has the reputation of being a financial wizard with a bent for technology.

In agreement with Anderson's basic strategy, the cigar-puffing Exley said his immediate mission is fine-tuning that strategy. "It's a matter of detail changes," he said. A major strength Exley brought to NCR was his experience working for Burroughs Corp., a company that had made the transition from mechanical to electronics products successfully.

In particular, Exley is refining the segmentation of NCR's present markets. NCR's sales force is organized into three divisions: financial; retail; and commercial and industrial. The sales force is further specialized by industry and by the power range of products each division sells.

"The key is specialization, and we have carried it to a degree unique in the industry," according to G.P. Williamson, vice-president of commercial-industrial/medical, education and government. For example, NCR has divided its banking market into commercial and savings sectors.

Search for Salespeople

The ability to recruit a sufficient number of qualified salespeople is a major challenge Exley sees NCR facing, even more serious than the ability to attract software design personnel. Today NCR is investing heavily in sales training.

NCR is also putting a lot of thought into what a marketing unit should look like, Exley said. Right now the basic unit consists of five people — a sales manager and four sales reps. NCR is expanding its sales organization by units.

Of course, that number is entirely subjective, Exley admitted, but the company is striving for the consistency it didn't have in 1974.

While NCR may be segmenting its market into increasingly specialized sectors, Exley sees the inherent design of the 8000 Criterion series allowing the firm tremendous expandability. The 8000, he claimed, is the first mainframe to use bus architecture — a design usually used in minicomputers. In addition, the Criterion series operates as a "pipeline processor"; this technology allows the processing unit to process information while other parts of the equipment are retrieving and passing on data.

With this design, "it has been a relatively low-cost matter for us to expand the power and number of models available," Exley noted.

By changing the firmware sets, the 8000s can operate in three different modes: the "I" or interactive mode, the "N" or batchwork mode and the "V" or virtual memory mode. This feature is part of NCR's Migration Path Engineering strategy which, when appropriate firmware changes are installed, allows users of 8400s and 8500s to operate in both N and V modes.

Playing Catch-Up

Despite these technological advances, NCR is an admittedly late entrant to the high-end sector of the general-purpose mainframe market. Its Criterion series, which spans the power range from small business systems to the IBM Series 30, was introduced in 1976.

Therefore, NCR must gain new users at a much more rapid pace than its competitors. For example, it has to sell to new users a larger percentage of its high-end V-8600, a system that would normally be targeted primarily as an upgrade.

To overcome this problem, NCR is promoting its V-8600s as a "stand-alongside" system. Potential targets for the stand-alongside sales are users who have paid for a batch processing unit that is doing a good job, but now want an interactive inventory application.

That's where NCR gets a foothold into the DP operation, Williamson explained.

"Our strategy is to sell the application package and the necessary hardware to execute it," Exley said. The sales strategy for NCR's Mission manufacturing control system is an example of making a hardware sale on the strength of an application package.

At the lower end of the 8000 series, 55% of the 8400s and 40% of the 8500 sold last year did not replace NCR equipment, Exley said. On the whole, small business systems, the 8100s, 8200s and 8400s, are showing the largest percentage growth.

Market Share: 2.4%

Despite its late entry into the high-end system market, NCR accounted for 2.4% of all general-purpose computer shipments last year, according to International Data Corp. (IDC). With an estimated 6,000 systems valued at about $1.9 billion installed worldwide, NCR holds about 2.2% of the market for general-purpose mainframes.

NCR's average system is valued at about $324,000, significantly below that of competitors and reflecting NCR's concentration in low-end systems. IDC estimated that NCR accounts for a 7% share of the small business systems market.

However, NCR holds the largest share of the total market for application-specific terminals, which include retail and supermarket point-of-sale terminals and bank teller terminals.

Compared to its five main competitors (IBM, Univac, Burroughs, Control Data Corp., and Honeywell, Inc.), NCR holds the smallest share of the general-purpose mainframe market, but its revenues have grown the most over the past five years — by a factor of 2.5. For its latest fiscal year, NCR showed revenues of $2.6 billion and earnings of $318 million or $11.25 per share.

However, without the gain of $124 million from the sale of its Appleton Paper Division, NCR's earnings for 1978 were about $194 million or $6.90 per share.

For the past three years the firm's earnings growth has averaged 39%, the highest of any of the other mainframers, according to *Computerworld* figures.

Not Afraid of Competition

Although the competition is fierce, NCR executives are not overly concerned about losing ground to IBM or the other mainframers. "In the past 15 years, IBM has replaced one product after another. We don't see it doing anything differently than it has been doing all along," Williamson asserted.

"If anything, IBM is spreading itself more thinly and may not be able to do as effective a job as in the past," Exley added. "IBM is not driving the industry; it is conducting business in its usual brilliant fashion."

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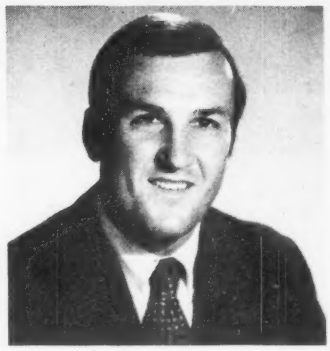


Clockwise from top left: NCR's headquarters in Dayton, Ohio; Charles E. Exley Jr., the firm's president; David G. Laws, vice-president of product planning; and G.P. Williamson, vice-president of commercial — industrial/medical, education and government.

Thorn in NCR's Pride: Beefs on Maintenance

By Marcia Blumenthal
CW Staff

While NCR Corp. takes pride in its marketing strategies and product versatility, its users are not too happy about its maintenance.

Obtaining spare parts quickly has been a big problem for users, one highly placed official in NCR's user group said. This problem was discussed at a recent users conference, and NCR is supposedly drafting a plan to remedy the situation.

When asked the particulars of the plan, however, both Charles E. Exley Jr., NCR president, and G.P. Williamson, a vice-president, said they didn't know about any problem with maintenance.

One disgruntled user, who asked not to be identified, said that when maintenance was an administrative write-off, it was easier to get spare parts. Now that it's a profit center, there is a tighter screen on parts.

"NCR outlined an elaborate inventory management system [for spare parts] that it said would be instituted in July. I don't think it will get the results it wants because NCR has not gone to the field service people and gotten their help in adopting the system," the user said.

"The main problem is getting the communication up to people who can do something about the problems," Grace Householder, chairman of the Federation of NCR Users Groups, added.

Lately, NCR has been taking heat from users over some of its pricing policies. For example, NCR began charging users very high fees for firmware reinitialization if they attached peripherals or software acquired from independent vendors. [CW, April 2]. Because of user pressure, NCR backed down on that policy and will charge for reinitialization on a time and materials basis.

In addition, an NCR memo circulated internally revealed the firm had a policy of reducing prices for memory upgrades if users showed NCR salespeople lower bids from competitors [CW, March 12]. Users were miffed because those who shopped around for memory were getting better deals than those who remained loyal to NCR.

NCR Playing Catch-Up

(Continued from Page 4)

David G. Laws, vice-president of product planning, chided industry watchers for being overly concerned with market shares. The computer industry is not a finite market; it is expanding as new applications are provided for users, he noted.

NCR's challenge is to find ways to increase the use of products so that "our users are able to absorb more product," Williamson said.

Financial Analysts Bullish

At present, financial analysts are bullish on NCR. Thomas Crotty, a vice-president at the Gartner Group, Inc., anticipates that the price earnings ratio of Burroughs and NCR stock will meet during 1979.

NCR is willing to hire high-priced talent, train its sales force thoroughly and be risk-oriented, according to David L.R. Stein, another vice-president with the Gartner Group.

While NCR is certainly on a growth track, "we've got as far to go as we've come," Exley remarked. Prone to speaking in sophisticated financialese, Exley said a future challenge is "getting appropriate yields from intellectual assets" — in other words, obtaining more productivity from staff involved in software development.

In addition, the company needs to develop a mechanism for appropriately pricing various software offerings. Exley anticipates maximum unbundling of software so "Customer A won't have to pay for something Customer B needs."

Exley quipped that he would like to see equipment unbundled to the point it could be left in a crate at the customer's door.

However, NCR has not neglected research and development. For 31 consecutive quarters, the growth in product development expenditures has increased faster than revenue.

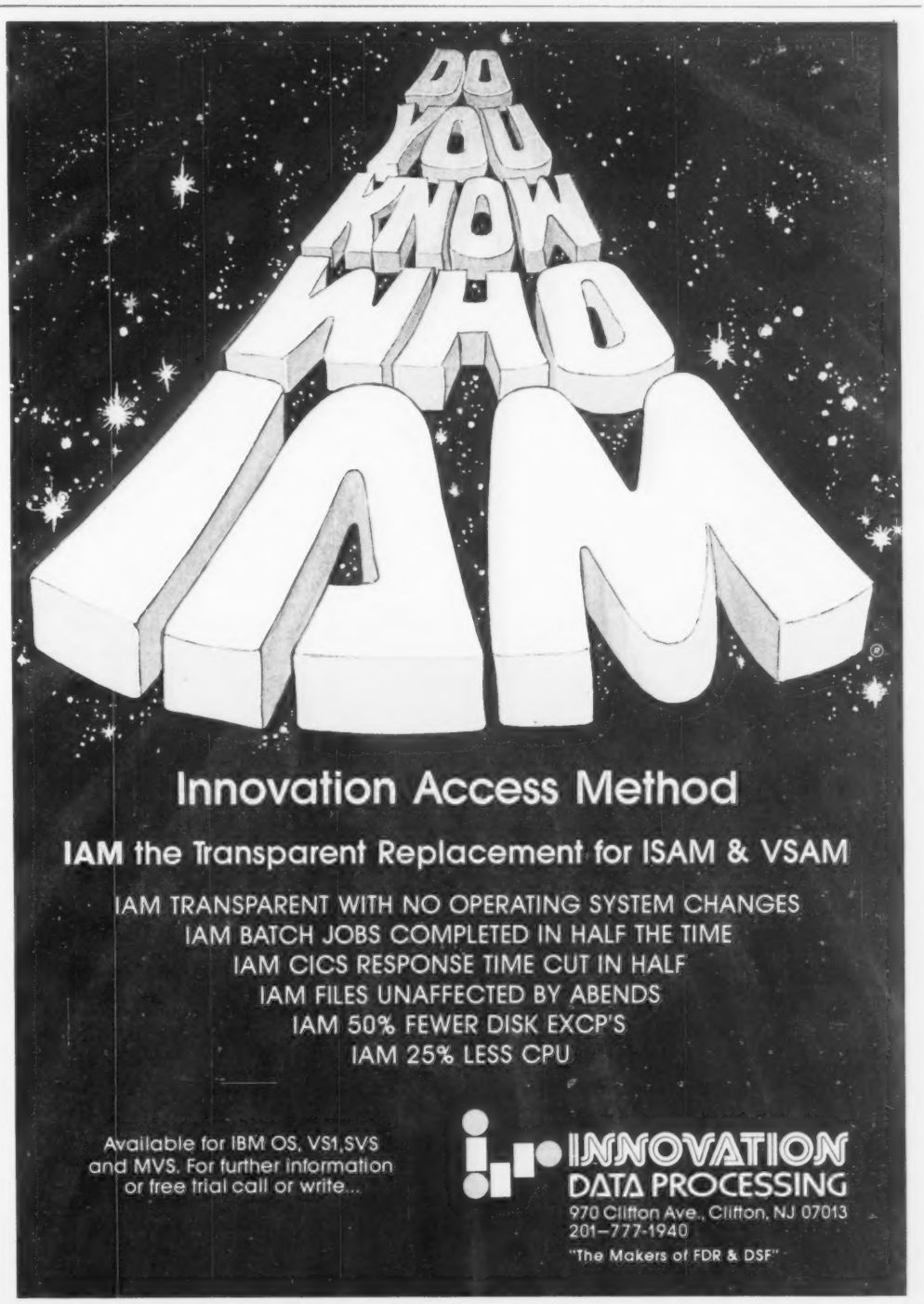
For its most recent quarter, product development expenditures, split about evenly between hardware and software, were up 24% whereas revenues grew by 17%, Exley noted.

More Risk-Prone

Although he would not reveal what new products areas NCR is exploring, Exley said the company today is more risk-prone than during the turnaround. The V-8600 and the recent acquisition of Comten, Inc. are examples of the risk-taking stance.

Comten was acquired for its extensive data communications software. "NCR will build its revenues from communications terminals and networking and will use its computers to support that when it has to," according to William Becklean, vice-president of Bache, Halsey and Stuart, Shields, Inc.

Other recent NCR acquisitions are Data Pathing, Inc. (1976), a firm that specializes in factory data collection equipment, and Quantor Corp. (1978), a computer output microfilm firm.



Wang Planning to Unwrap CPU in 4341 Range

By Brad Schultz
CW Staff

NEW YORK — Wang Laboratories, Inc. launched an ambitious campaign to pioneer in "integrated information systems" last week with the announcement of a virtual storage (VS) CPU more powerful and less expensive than IBM's 4341.

Or did it?

Still "in engineering," the 32-bit VS 100 will not be delivered before the summer of 1980, spokesmen stated. Yet Wang is dead serious about taking orders right now for this addition to its high-performance VS family. The systems are intended to spearhead Wang's drive for preeminence in integrating data and word processing functions in distributed processing environments, the vendor told reporters assembled near the National Computer Conference.

The projected VS 100 marks an eightfold jump in throughput for the VS line, while maintaining complete compatibility with the VS products presently available, a spokesman declared.

The system will offer 256K to 2M bytes of main memory augmented by a 32K-byte cache. IBM's 4331 and 4341 and comparable systems from other vendors do not offer cache memory with more than 8K bytes, the spokesman pointed out.

The VS 100 will drive as many as 128 workstations and 128 other peripherals with no response time degradation, he said. Disk storage capacity was put at 4.6 billion bytes — twice as much as the current VS offers, but much less than the 4331's nine billion-byte capacity of the 4341's 18 billion-byte store.

A VS 100 with 1M-byte main memory and maximum disk storage will sell for $93,000 compared with the $245,000 tag currently on a 1M-byte 4341 with full disk or the $65,000 IBM is asking for a 512K-byte 4331 with full disk. Wang will add main memory to the basic VS 100 in 256K-byte increments for $9,000 each.

A central processor "look-ahead" feature that initiates the prefetching of data from main memory, anticipating the processor's need for this data, is planned for the system. Spokesman also specified a 64-bit system bus, with adapters to assist additional I/O processors, and a slew of telecommunications options.

Optional 3270 Emulation

Wang announced an I/O processor known as the 22V06 that optionally implements the 3270 communications protocol by emulating IBM's 3271 cluster controller. This reportedly allows VS workstations to emulate a 3277 terminal.

The 3270 option "enriches our networking and distributed data processing ability by offering complete interactivity at remote locations in addition to our 2780/3780 batch protocols," a spokesman maintained. To be available in October, the 3270 emulator carries a $1,500 license fee. The 22V06 is immediately available in one-, two- or three-line bisynchronous models that cost $2,500, $3,300 and $4,100, respectively.

In September, Wang will release word processing software and a terminal, the 2246C, for use with the current VS and projected VS 100. The $4,300 terminal must be purchased with the $5,000 software package; it will permit an operator to switch from DP to word processing and back, the source explained.

Data Management

Wang also took the wraps off its advanced data management system (VS-ADMS) and data base management system (VS-DBMS). "What makes these new products unique is their complete integration into the VS operating system, languages and utilities," the spokesman said.

VS-ADMS was credited with logical data independence, automatic logging and recovery, a multiuser update capability, a data dictionary that allows for centralized control of data and applications systems, multiple access paths and "high performance." With no need for conversion, all current VS software will run under VS-ADMS, slated for release in January at no cost to the user.

VS-DBMS may cost peoples' jobs. With the software, all data descriptions germane to data base organization are entered and manipulated interactively via Wang's workstation. This purportedly eliminates the need for highly specialized data base administrators and designers.

VS-DBMS will be available in September for a license fee of $15,000.

As for languages, Wang will deliver Fortran in July 1980 and PL/I the following December for $3,000 per compiler. The VS family currently offers Cobol, Basic, RPG-II and assembler.

A number of applications software packages will also support the VS. And an electronic mail system called Mailway — now used internally by Wang — will eventually be marketed.

Wang put a $69,000 tag on the minimum VS 100 configuration, consisting of 256K-byte memory, assembler and one language compiler. Final testing of the system has yet to begin, a spokesman confirmed. First deliveries are scheduled for July 1980.

Wang is located on One Industrial Ave., Lowell, Mass. 01851.

Wang Adds to WP Gear, Software

By Brad Schultz
CW Staff

NEW YORK — Wang Laboratories, Inc. announced an array of word processing (WP), peripheral and communications products last week to complement its integrated information system concept.

Two Office Information Systems (OIS), a WP-oriented Basic software package, a forms management package, a daisy wheel printer and various communications options were presented with the announcement of another Wang virtual storage system at the National Computer Conference here.

The OIS/145 now tops Wang's office systems line "in direct response to users who require large data bases and an additional number of workstations," according to a spokesman. Thirty-two peripherals can reportedly be linked to the 145, including 24 workstations, intelligent printers, typesetters, optional character recognition readers and magnetic card readers.

The basic OIS/145 can store up to 114,000 pages of data, the spokesman said. Add-on increments of two additional 275M-byte disk drives can bring total on-line storage to 835M bytes, or 334,000 pages of text. This capacity was termed 4.5 times greater than that offered by the OIS/140 Wang introduced last December.

The debut "represents a tremendous increase in the number of documents any one system can handle and, with the addition of Wang's new OIS/Basic option, the user can also perform sophisticated WP tasks and have powerful DP abilities in one easy-to-use system," the spokesman maintained. The OIS/145 will be available for upwards of $53,000 in late September.

Smaller Version

Another OIS, the 125, was upwrapped for medium-size work groups and small WP centers. The system can reportedly support up to 14 workstations and peripherals in any combination and store 5M bytes of on-line data.

A second disk storage device able to hold 2,000 pages — half of them removable — can be added to the OIS/125, which will be available in early September with a low-end tag of $19,600.

With the entry of Wang's OIS/Basic option, any OIS workstation can be upgraded to handle both WP and DP tasks, the spokesman continued. The option allows multifunction and standard WP workstations to function simultaneously in any OIS configuration.

"Wang selected the popular Basic . . . because it is the simplest language to learn and use and because it provides the best bridge between number-crunching and commercial DP applications," another source noted.

"We also chose Basic because we have a worldwide sales and service network already in place to support Basic," he said. "We've even added a programmerless forms management package so source automation tasks, such as order entry, can be added to the system when the need arises."

Forms management was the first application software package announced for the OIS series. This Basic package allows operators to create, edit and print forms quickly and accurately, the spokesman asserted.

With forms management, operators can employ an activities menu to create and edit forms, expediting data entry; sort data by specified fields; search and retrieve records that match specified fields; search and retrieve records matching specified criteria, facilitating report generation; display data on a CRT; or output data on paper.

However, a 48K-byte workstation — either Wang's Model 5536-3 or Archiving Workstation — is necessary for this application. The workstation costs $4,600, while the forms management license fee is $1,000. Wang's OIS/Basic license goes for $15,000, with each additional system upgrade costing $1,000. Both OIS/Basic and the forms management package will be out next month.

Communications Option

On the communications front, Wang released its OIS/3270 bisynchronous protocol option. The protocol enables OIS workstations to emulate IBM 3277 terminals and to communicate directly to host mainframes within a 3270-supported network.

This allows the OIS to access information from central IBM mainframes under CICS, IMS or the Stairs information management system. The option will be available later this year for $1,800.

Finally, Wang introduced its Twin Head Printer for use with any OIS. Using two daisy wheels simultaneously, the printer automatically changes print wheels, obviating the need for manual wheel changes during document production. The printer costs $9,750.

Wang's address is One Industrial Ave., Lowell, Mass. 01851.

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Proposal Book Rocks Industry

A California publishing firm has literally taken the computer industry by storm with a recently-published "how to" on proposals. The book, a 256 page volume entitled *How to Create a Winning Proposal* covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top west coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in both government and commercial proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

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Copies are available from Mercury Communications Corp., 734-A Chestnut St., Santa Cruz, CA 95060. $52 (prepaid) includes UPS delivery inside the USA. In Calif. add $3 tax. To order C.O.D. call 408/425-8444.

Big Systems No Longer Best

Lecht Voices Fear for Users' Survival in 1980s

By Tim Scannell
CW Staff

NEW YORK — Caught in a whirlwind of plunging hardware prices and rapidly advancing technology, the computer industry is undergoing radical changes.

Weaned on the skyscraper philosophy of computer architecture, which advocated that the big system was better, DPers are now struggling to survive in the "few cents apiece arena" of computers on a chip, according to Charles P. Lecht, chairman of the board and president of Advanced Computer Techniques Corp. And if computer diehards aren't quick to adapt to the changing technological scene, they may take a wrong turn at the wrong time and discover too late that their massive IBM 370 systems are good for little more than providing warmth.

Speaking before a packed audience of computer specialists and industry fans here at the National Computer Conference last week, Lecht presented a carefully plotted portrait of the future of the computer industry. Although the presentation took place in the ornate Grand Ballroom of the New York Hilton, complete with old-fashioned, ruffled curtains and the mandatory crystal chandelier, the subject — the future direction of computing — was anything but antiquated.

Pointing out that current computer systems are just about obsolete by the time they roll off the assembly line, Lecht warned computer users to tread cautiously through the "blizzard" of more powerful machines and faster memories. If users "keep changing plans from [product] announcement to announcement, they'll soon die," the computer expert said. "Only the healthy will survive, and to the survivor will go the spoils."

Industry's Evolution

By means of a multiscreen slide show, Lecht outlined the evolution of the computer industry from the early '60s through the '70s to the critical '80s. The '60s were dominated by large centralized computers and satellite stations that were, for the most part, independent, Lecht explained.

In the '70s, rising costs and increasing systems overhead brought about the use of small, intelligent computer systems — many of which were linked in a distributed processing fashion.

The '80s, however, will unveil a different type of computing from the previous two decades, Lecht noted. During the next 10 years, computers will evolve into utilities consisting of a number of specialized nodes and terminals.

Low communications costs and standardized communications protocols will not only open the door for greater resource sharing, but will allow the nontechnical person to take advantage of a machine's processing power, Lecht predicted.

Likening sophisticated computer systems to chunks of real estate, Lecht observed that the DP world is becoming less and less dependent on architectural space. Analysts are eagerly awaiting the day "when someone will come up with a Cray-1 on a chip and blow the whole [industry] out of the water."

Meanwhile, as people slowly discover how inept they are at controlling such issues as labor unrest and inflation, automation becomes increasingly desirable, Lecht said. A number of banks are already using isolated robot tellers to service their customers, counteracting skyrocketing employee salaries, which are expected to be about $2,200 per person per month in 1982, he noted.

Technical Tug-of-War

Although computer technology is becoming more understandable and an indispensable part of current lifestyles, the computer industry is involved in a technical tug-of-war, according to Lecht. For all their sophistication and power, computers still have a downtime rate of 7% to 10%.

In addition, he pointed out, maintenance costs are at an all-time high. And although hardware prices are constantly dropping, the continuing influx of equipment is making relatively new systems obsolete, causing them to "decay like overripe bananas on a windowsill."

CW At NCC

As a result of the computer industry's technological instability, users have discovered that it makes more sense to educate the machine rather than the person who is operating it, Lecht remarked. By relying on techniques of artificial intelligence and computerized prompting, a variety of people can use computers whether they are interested in the technology or just want to process a piece of paper.

Lecht chastised the universities and scientific laboratories that promote computerized "hieroglyphics" and encourage a DP elite. The company president and author also advised users not to rely too heavily on the vendor to supply programming and code.

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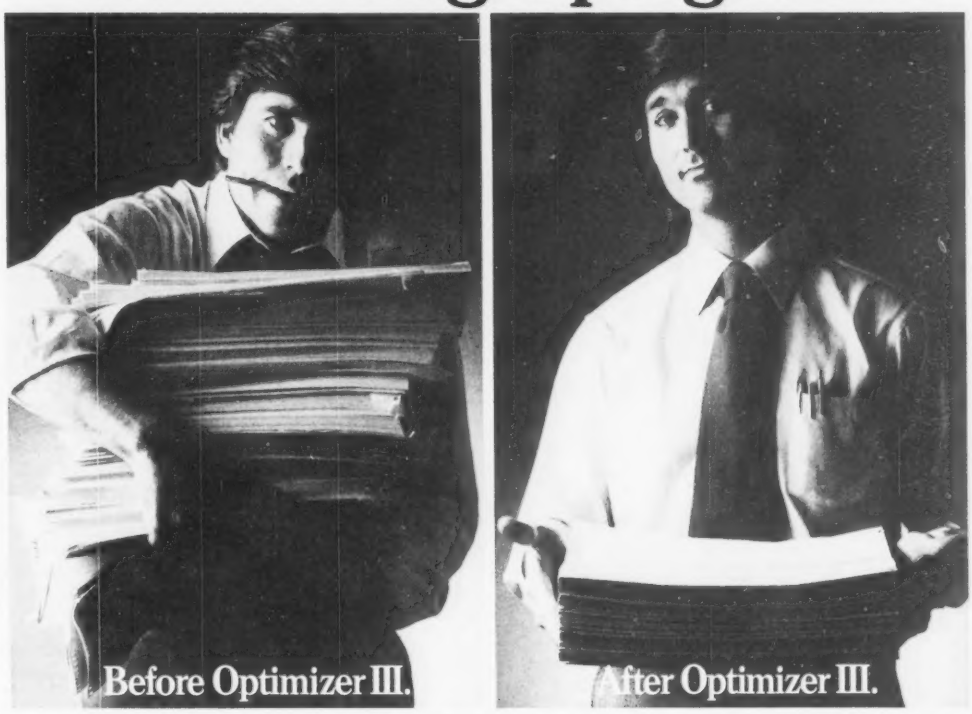

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NCC '79: Not Much New, But a Lot of People

(Continued from Page 1)

on buying and selling rather than gimmicks, giveaways and girls.

And it drew the buyers and browsers. A random *Computerworld* sampling of NCC visitors showed the majority were there to look at the hardware.

"Most of the stuff has been written about somewhere along the line, but it's nice to see it in person. I was very impressed," said Frank S. Greenwald, vice-president of engineering for Magnetics and Electronics Co. of Marengo, Ill., who dashed through the show in one day.

Seeing as much as possible at the Coliseum in one day was not an uncommon assignment for many visitors. As the numbers show, many visitors were at the show for the first time or had not been to NCC for several years.

"The hardware was better than the last time I was here four years ago," William E. Johnson said. A systems analyst with Pratt & Whitney Aircraft of Hartford, Conn., Johnson was here for a day with about a dozen colleagues and also visited a New York City installation, apparently not an unusual combination for many NCC visitors.

Peter P. Krolinsky, a research analyst with the Mission Hill Group of Las Vegas, took three days to see what he wanted. "NCC is the biggie — all the world hitters are here," he explained. Krolinsky echoed other visitors' remarks that they were impressed to see so many exhibits from the big manufacturers.

"One of the things about these shows — it's impossible to absorb it all," Krolinsky added.

"I'm pretty satisfied," reported Rex Franciotti, director of the computing center at Adelphi University, who was at NCC both as an instructor and as a shopper. "After three days I've had it."

"As big as this organization is, the first day could have been much better and more efficient," observed Dr. Alfredo Gabriel, manager of central placement for TRW's Defense and Space Systems Group in Redondo Beach, Calif. Gabriel suggested registration and other signs at the Coliseum should have been in additional languages besides English.

Disappointment in Sessions

However, if the exhibits at the Coliseum were hits, technical and plenary sessions at the New York Hilton and Sheraton Centre hotels got less glowing reviews — depending on the background of the NCC visitor.

"Nothing really grabbed me. I looked at it and I would have gone to the sessions if there had been something interesting," Hershel Wolf, a systems analyst with Union Carbide who was attending his first NCC, said.

"I was disappointed," said Warren Adis, a research associate at the New York Institute of Technology in Old Westbury, who came only for the conference session. "The speakers were not prepared to deal with the issues — issues a fairly technical audience expects. I expected more than they supplied."

For an academician, NCC may not be the best place, Imrich Chlamtac suggested. A member of the computer sciences faculty at the University of Minesota, Chlamtac said NCC is geared to the computer professional and there are other conferences which focus on specialties within the field.

Several other NCC visitors on the development staffs of computer manufacturers agreed NCC was not the best place to get information, but added that it was important to see what users were interested in.

The sessions were too technical, Ted Clarke, a product manager for Informatics, Inc. of Fairfield, N.J., commented. However, he liked the plenary sessions which gave perspective to the computer industry and technology.

Too Far From Exhibit

One of the biggest problems with this year's sessions may have been that, unlike the past, they were in facilities separate from the exhibits. Exhibit visitors said they would have taken in a session, if ony to rest their feet, but the hotels were too far from the Coliseum.

"The sessions were hard to find. No one could tell me where they were," said Hal Fischbach of IBM's development staff in Endicott, N.Y., who was still asking for directions when he got to the Hilton.

If anyone was enthusiastic about the sessions, it was several women questioned. "I got a couple of practical hints for on the job," Susan Mulbach, a programmer with the consulting firm of Towers, Perrin, Forster & Crosby in New York, said.

For Nancy B. Bryan, a department manager with Mason Research Institute in Rockville, Md., the NCC sessions were not only educational, but an opportunity to organize the embryonic Association for Women in Computing. The sessions rel ting to women were well attended.

'Just Too Much'

"There was just too much, too much," conceded Barbara J. McGough, a systems programmer with the Army Publications Center in St. Louis, her eyes literally lighting up when asked what she was most impressed with at NCC.

"What I liked best was taking 15 people on the New York subway in the rain from the Sheraton to the Coliseum when the NCC shuttle bus didn't show up," McGough said. "I'd never been on the subways in New York before, but my brother told me which train to take — D."

CW Photo by A. Dooley

A Quiet Moment in the Exhibit Hall

When Right Is Wrong

By Tom Henkel
CW Staff

NEW YORK — When you're right you're right, right? Maybe.

Efforts to provide equal rights for smokers and nonsmokers spawned what had to be one of the longest debates of last weeks National Computer Conference here.

NCC officials printed signs designating the right side of each session room as the smoking side — the left side, of course, being the nonsmoking side. But most session rooms had two entrances, front and back. If one entered through the front, left was right and right was left. If one entered from the back, right was right and left was left. Which interpretation was right? Most participants in last week's conference sessions soon adopted an easy rule: "The side with the ashtrays is the smoking side."

Again, a simple enough assumption, right? Well the guys who set up the rooms for each seminar also had problems.

Some sessions had a large sign designating the right side of the room for smoking, and all the ashtrays were on the left. So the people who wanted to smoke and who sat on the right side found themselves without ashtrays.

And the nonsmokers, who sat on the right left side, found smokers, following the ashtray rule, on the wrong right side.

The ultimate solution soon became apparent — devote the first five minutes of each session to a discussion of which right side is right. Then you wait until everyone is in the right seats.

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People-Related Causes

Why Do DP Managers Fail? Some Answers

By Howard A. Karten
CW Staff

NEW YORK — What makes managers fail? Why do so many managers — particularly in DP — seem to be looking for jobs every two or three years?

The causes, according to James F. Towsen, are seemingly minor — virtually all of them people-related. Analyzing and avoiding the reasons for failure are important, Towsen said, because "all of that equipment isn't worth a damn if there aren't good, solid people behind [its] development, use and marketing."

Leading a session devoted to exploring "Why Managers Fail" at the National Computer Conference here last week, Towsen hammered home his theme that the most important part of management jobs is people, not technical ability.

Towsen, president of the two and a half year old management consulting firm, Towsen Associates of Harrisburg, Pa., gave the interested audience a catalog of the pitfalls managers should avoid.

First, they should avoid "minding everyone's business but their own." Some managers indicate blithely that they have no problems in their own departments, but believe that many other departments in their organizations are "screwed up."

In addition, managers or supervisors headed for failure often talk "too much about the wrong thing at the wrong time and to the wrong people," he said. "They can't wait to impress their organizations with what they know."

Second, managers should not attempt to deal with the personal problems of subordinates, Towsen said. Most managers are generalists and are not equipped to handle these problems. They should put employees in touch with the right people in their organizations to handle such problems.

"Managers attempt to be Superman and get everything screwed up," he stressed.

Another common failing is avoidance of responsibility when things seem to go wrong. Those managers who gratefully accept awards and accolades but shirk blame for a bad situation soon lose the respect of those around them, Towsen noted.

If this information seems repetitious

CW At NCC

and hardly startling it is because many managers have still not learned these lessons. "You will not hear anything new in this session," the management consultant told the audience.

A manager's job consists primarily of four responsibilities: planning, organizing, communicating and managing time, the enthusiastic Towsen said. "If he can't do these things, he should take another job" perhaps in a technical field if that is where he started, but in any case not as a manager, he added.

Managers who rise through the technical ranks of an organization — particularly a DP organization — should remember when they are appointed managers that they are no longer doing technical work. "A manager must know how to cross over being a technician to a manager," he stated.

If a manager comes into this office and finds a hardware-related problem and a people-related problem, he should tackle the latter first. "That will help you solve the hardware problem like a hand fitting into a glove."

The lesson, which Towsen stressed repeatedly, is that a manager's job is to manage; other people do the technical work, and managerial responsibilities always precede technical ones.

"Many of us were good at DP and are happier with a coding sheet in front of us," he told an appreciative audience.

"Closed-door management" must be avoided at all costs. Towsen recalled the time he was walking with a manager he was visiting. It was impressive to see how employees greeted the manager, and he responded in kind.

Gain Weight?

NEW YORK — James F. Towsen, president of Towsen Associates in Harrisburg, PA., has an "Executive Weight-Control Diet" for managers.

It's not a diet in the usual sense. Rather, it's a light-hearted look at some ways to add calories — or extra, unneeded work — to an executive's daily work diet.

"Beating around the bush" is worth 75 calories per bush, Towsen said. Jumping to conclusions — 150 calories per jump. Making mountains out of molehills — 700 calories. Straddling the fence on an issue — 200 calories per fence.

"Dodging the issues is worth 200 calories for each issue dodged; raising [needless] objections — 150 calories per objection.

"How much weight did you gain as an executive last week?" the slightly rotund Towsen asked the audience.

(Advertisement)

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During the last few years, we have sold thousands of our System/360-370 assembler language books to DP professionals. There are two versions of this book — one for DOS, one for OS — and both books are sold with this unique guarantee. If you can't learn assembler language from these books, you can return them for a full refund no matter how long you've had them.

Now, the results speak for themselves. Less than three percent of the buyers have returned our texts. And dozens have taken the time to write letters of praise.

Once you finish one of our assembler language texts, you will have several new skills. You will be able to debug using storage dumps ... regardless of the language you're using. You will be able to write and use BAL subprograms. You will be able to maintain and develop complete assembler language programs ... even ones that process ISAM and direct files.

In addition, you will have a deeper understanding of what actually happens as one of your programs executes. As a result, you will be more independent, more in control of your system.

4 Reasons Why Our Books Are Effective

1) The books were written by Kevin McQuillen, an expert from industry. He's been a DP manager, consultant, and manufacturer's rep, so his books are chock-full of solid, practical, real-world advice.

2) The content of these books is based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer, and very little that isn't. That's also why these books give substantial coverage to job-control language. The DOS book covers DOS and DOS/VS. The OS book covers MFT, MVT, VS1, and VS2.

"Got your assembler language text yesterday and stayed up half the night reading it. The book is great."

Programmer
East Hartford, Conn.

3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

"As I read through the book and began formulating questions, I found that every question was answered shortly afterwards. I have never felt so comfortable with a subject that has always made me a little uneasy."

Programmer
Indianapolis, Ind.

Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

"Your book has been a tremendous help to me. I would recommend it to anyone."

Systems Analyst
Omaha, Nebraska

Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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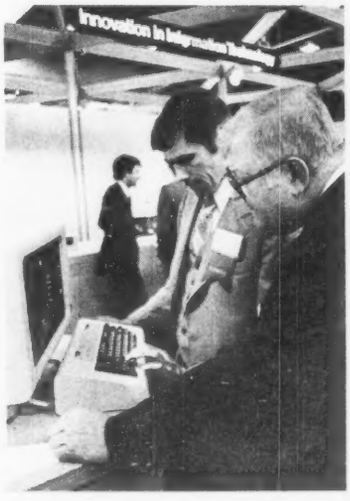

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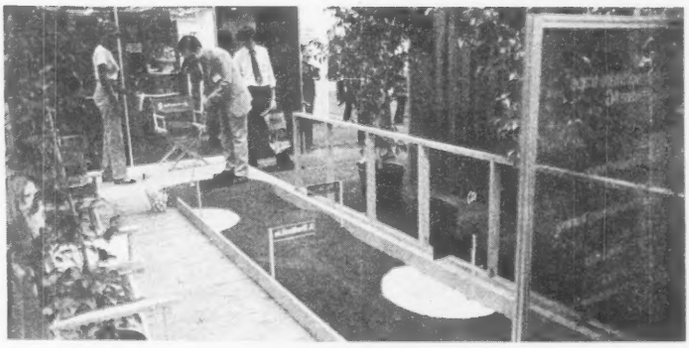

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White House Urged to Relax DP Export Curbs

By Jake Kirchner
CW Washington Bureau

NEW YORK — The Carter Administration was urged last week to end the "adversary relationship" between the federal government and U.S. industry and to relax export controls on American high technology.

Although the data processing industry is "philosophically and pragmatically" supportive of human rights and national security, present export control practices do little to further U.S. international policies, a session of the National Computer Conference was told here last week.

Present policies are "confused and unnecessary and encumber our industry," according to John Frahm, chairman of the foreign trade committee of the Computer and Business Equipment Manufacturers Association (Cbema).

State Department representative Bill Root challenged Frahm's assertion that the Administration views industry as an adversary. He also argued that the DP equipment export licenses that have been denied have constituted only a small fraction of those requested.

With legislation that would replace the soon-to-expire Export Administration Act of 1969 now being debated in Congress, the June 5 NCC session was particularly timely. Frahm, manager of International Government Activities at 3M Co., said he hopes Congress will end the "unilateral, arbitrary and uncertain export policy that now exists."

In a presentation very critical of the Carter Administration record on export controls, Frahm said that since the trade embargo imposed on goods destined for the South African military, the DP industry has been "waiting for the other shoe to drop." What country will be next? he asked rhetorically.

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Is anyone in the Administration looking at the effects, of such actions? he asked. Frahm warned that in addition to the dollars lost through denied export licenses there are "second-level effects." These include the loss of trade as other countries come to view U.S. firms as unreliable suppliers.

With about 70,000 export license applications coming in to the Commerce Department every year, the government does not have the resources to evaluate the technology involved, Frahm argued. He urged support of legislative proposals that would limit export controls to critical national security considerations, mandate periodically updated export control lists and set up flexible procedures to streamline the license approval process.

"The Administration and Congress must realize that we are our own worst enemy," Frahm declared. Present export control policies only add to the U.S.'s giant international trade deficit, help out competitors and interfere with the country's political aims abroad, he said.

No Reason to Fear

Bill Root, director of the State Department Office of East-West Trade, told the NCC session "there are many points in [Frahm's] presentation with which the Administration agrees wholeheartedly. The government certainly does not regard industry as an adversary."

In defense of the Administration, Root said "the [export control] situation certainly does not seem to be getting much worse." Foregoing his prepared remarks to answer the charges leveled by Frahm, Root ventured that perhaps "no other shoes will drop" as Frahm fears.

The Administration recognizes increased exports are "in our own national interest," Root said, pointing to the Sept. 26 statement in which President Carter promised to restrict exports as little as possible.

No one, however, wants to do away with all export controls, he said. In fact, the Administration is under considerable pressure to do more to protect the country's "critical technologies" by not allowing them to be exported. All in all, the government has done a good job managing export licensing over the last 30 years.

Only a small portion of applications have been denied, he noted. And presently, possible " export disincentives" embedded in government policies and programs "are being studied on a comprehensive basis." In addition, some of the legislative proposals backed by Frahm were actually proposed by the Administration, Root claimed.

As for the South Africa embargo, he pointed out it was not a selective embargo aimed at DP products. Controls were applied "right down to shoe strings and toothpaste." The government felt the U.S. should have no part in supporting the instrument of that country's apartheid policies.

One major problem facing the Administration in the export area, according to Root, is that it "is being pushed further than it wants to go." As an example, he noted the Administration argued a full trade embargo against Uganda would not be effective, though Congress insisted on it. He also reminded the session attendees that the President was severely criticized by some members of Congress for backing off from his earlier ban on a Univac sale to Tass, the Soviet news agency.

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Credibility Problems Ahead?

DPers Viewed as 'Nuclear Engineers' of '80s

By John Whitmarsh
CW Staff

NEW YORK — Privacy abuse could shatter the public credibility of the computer community just as the Three Mile Island incident destroyed the nation's confidence in nuclear energy, a National Computer Conference seminar participant warned here last week.

Lance J. Hoffman, associate professor of computer science at George Washington University in Washington, D.C., told attendees at a privacy and security session that a large-scale data bank abuse is practically certain within the next five years and that it would destroy an already frail computer credibility in the public's eye.

"Computer people will be the nuclear engineers of the 1980s. The loss of credibility and the self-doubt that came to nuclear engineers at Three Mile Island will come to us," Hoffman predicted.

Hoffman admitted that his was an intentionally controversial thesis, designed to spark debate and discussion of key privacy issues of the 1980s.

Too many "disquieting similarities" exist between the plight of nuclear engineers at Three Mile Island and the situation of computer end users today. Among those similarities are:

- The tendency to compound a problem while trying to fix it.
- Inadequate instrumentation.
- The lack of emergency planning.
- Inadequate monitoring of existing government regulations.
- A public backlash against systems of all types.

Such deficiencies could lead to disaster, Hoffman said. "I predict a gross data bank abuse within the next five years will be our own Three Mile Island."

Averting Calamity

Hoffman's thesis struck a responsive note in Robert L. Chartrand, senior specialist in information policy and technology for the Congressional Research Service in Washington, D.C.

Chartrand said there is "a great likelihood" for a computer crisis on the order of magnitude of Three Mile Island, but that those odds could be reduced if the computer community would draw on information-handling techniques already perfected.

"I am often discouraged that the enormous investment by the military and aerospace industries over the past 20 years has been largely ignored," Chartrand said.

"Protocols and information-handling procedures could, with some modifications, be used today. These were worked out by systems design and trial and error over many years. There is much to remember as well as much to innovate in this area."

Privacy has gained the attention of Capitol Hill, Chartrand said, echoing the feeling of other panelists that privacy is now politically popular. Various groups in Washington are concerned over what they see as the "chaotic" handling of information at Three Mile Island, Chartrand said.

Panelists agreed that the aroused public concern over privacy stemmed from Watergate and the misuse of private information by public officials.

But no such abuse has been reported in the insurance industry or in business in general, according to Irwin J. Sitkin, vice-president of data processing and administrative services at Aetna Life & Casualty Co.

One reason is that private companies have followed Aetna's lead and implemented extensive privacy safeguards at minimal cost, he said.

The issue of privacy protection tends to get bogged down in "semantic morass," according to William Ware, a member of the corporate research staff of The Rand Corp.

Definitions of privacy, security and confidentiality often blur, Ware said, but two chief distinctions ought to be kept in mind.

One is the distinction between privacy in the informational or record-keeping sense and privacy in the civil liberties sense.

The other distinction is between privacy violation and the "socially distasteful use of information, as in the matching of welfare rolls."

CW At NCC

These and other complexities surrounding the privacy issue justify the return of traditional privacy definitions, Ware said.

Ware refuted the similarities between the computer field and the nuclear energy industry, saying that such comparisons could be drawn.

He also disagreed with Hoffman's conclusion that a large-scale data bank abuse would have disastrous consequences for private citizens.

"I don't agonize as dramatically over data base abuse as you do," Ware told Hoffman during the concluding panel discussion. "Data base abuse has no comparison to a nuclear energy disaster or an airplane crash. It is unlikely that if a computer hiccups, a person will die. The scale of risk and damage is not the same."

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Power, Politics Interact in MIS, Educators Say

By Connie Winkler
CW Staff

NEW YORK — "Information is power" and "people are funny." Information systems managers readily recognize these truisms because they see them in operation every day.

Four academicians looked at these truisms in greater detail at a National Computer Conference session here last week on "Power, Politics and Structure: Computers and Organizations."

The concepts of power and politics are useful when looking at what really happens in both management information systems (MIS) and in organizational behavior and management, explained session chairman Lynne Markus.

"A position in the hierarchy of an organization gives the employee access to information resources. Information is power; therefore, where you are in the information systems hierarchy

CW At NCC

represents where you are in the power hierarchy," Markus said.

Politics is the use of power and influence to affect changes, Markus said. "Like the organization itself, information systems can be thought of as the structure that gives people access to power and other information resources." Markus is working on a doctoral thesis on the subject.

Manager Alienation

"Did management information systems alienate the white-collar manager as much as automation alienated the blue-collar worker?" Daniel Robey asked that question in an international study he completed recently on the effect of MIS on managers' task scope and job satisfaction.

"The user is not a loser in this situation — at least not in his own eyes," according to Robey, an assistant professor of management at Florida International University.

Although the scope of the manager's task has increased with the introduction of MIS, the manager perceives the changes since MIS as favorable. Robey is at a loss to explain why managers are happier, but suggested the expectancy theory of motivation — the desire to live up to the expectations placed on one — is responsible.

"We should worry less about the impact on the task scope of managers and concentrate more on enhancing the user's performance and rewarding performance when it does arise," Robey said.

Peter G. W. Keen, soon to be associate professor of information systems at Harvard University, argued that all information systems management is political. "Buying a computer does not entail a technical decision, nor does rationality have anything to do with it," said Keen with a smile, but in all seriousness. All information systems are irrational decisions, and managers have to be aware of this.

He posed an interesting analogy — the computer as a useful tool. The first problem is to make the computer usable. The second problem is to use it. Implementing an information system is a political job, and this is the "dirty secret" no one talks about, according to Keen, who did a study of state government information systems.

"We have to learn the consequences of collecting trivial data," Keen continued. He gave an example of the impact office automation data bases could have on secretaries. Told that data bases could report how much time employees took to perform certain jobs — or to drink coffee — one woman responded rather dramatically. She took off her shoe, lifted it to Keen's face and said every secretary in that company would knock the heel of her shoe into the word processing screen if data bases were used for such evaluations. Think of what would happen with managers and their managers, Keen said.

"The biggest single barrier to innovation in applications in two-thirds of all organizations is the DP group," Keen said. "The DP group is at the trailing edge of technology and is fighting to keep it that way."

To centralize or to decentralize: that is the question Margrethe Olson and information systems colleagues at New York University are examining. As yet, they have no firm answers.

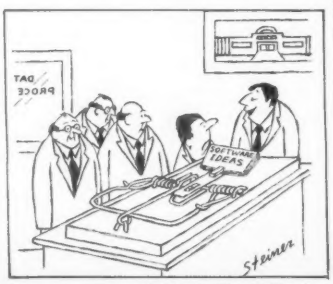
However, Olson talked about some of the possibilities.

The way an organization uses its information system depends on the characteristics of the organization itself, according to Olson, an assistant professor of information systems. One company — which was divided on products lines — originally had a centralized DP shop, but three years ago sent the systems analysts to the divisions. Today, the analysts still identify more with the central DP operation and have not increased their own expertise. In fact, they are isolated in a corner of the product division.

At another company divided by function, DP remained centralized. However, one person in each division became a user system analyst or a liaison between the user and DP. "It was decentralization by default," Olson said.

Even with decentralization, who ultimately controls the information system remains a question. That control can remain centralized even with distributed processing, she said.

Olson also strongly urged that DP information systems managers take responsibility for the technology, including office automation systems, they are introducing to their organizations.



'Towson, About This Antitheft Device of Yours . . .'

How to Kill a Bad Idea

NEW YORK — Every information systems manager has been faced with a user application idea he knows won't work. Now there's wisdom on how to ensure it won't happen.

"Most ideas are 'lousy' ideas, anyway," Peter G. W. Keen said, rationalizing his sabotage secret. Keen calls it "counterimplementation," and he let the cat out of the bag at a session on organization and information systems management at the National Computer Conference.

Keen's steps to counterimplement an idea are:

- Never, never resist an idea when it's proposed.
- Remember, the strategy should be to delay an idea because it probably won't work.
- Most importantly, when the idea is introduced, say, "It's a good idea, but let's do it right!"
- "Doing it right" means increasing the number of people involved. "Somewhere in there, someone will be incompetent and mess things up," Keen quipped, adding that people forget how difficult it is to coordinate people and large projects.
- Saying "do it right" means there will be no consensus on what is "right" and therefore no consensus on what should ultimately be done.
- "Doing it right" means getting financial, marketing and products involved. Marketing and product people will never agree on anything, the academician observed.
- After all this, the sheer inertia in organizations will kill the idea.

"If indeed most ideas are dumb ideas, there are no right answers," Keen observed. "It's a pluralistic process — change occurs from the bottom up."

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From DBMS to Operating System

Plethora of Packages Introduced at Conference

By Don Leavitt
CW Staff

NEW YORK — A fair amount of software was introduced at this year's National Computer Conference, but like everything else at that monster show, it took some effort to find it.

Some of the vendors and their wares were easy to locate. At the Perkin-Elmer Corp.'s booths, for example, a whole clutch of terminals were tied into a Cobol-based transaction processing system called Reliance.

Reliance runs on 32-bit Perkin-Elmer (once Interdata) minicomputers under OS/32-MT. It is made up of an enhanced version of the company's Integrated Transaction Controller (ITC), a new data base management system (DMS/32) and an ANS Cobol 74 compiler.

With Reliance, users can interactively design transaction-oriented CRT screen formats and program their applications. DMS/32 is said to include automatic transaction rollback, record locking and unlocking and a rollforward technique for data base reconstruction.

The system supports 128 Perkin-Elmer Model 1200 CRT terminals for transaction processing and an additional 32 time-sharing terminals for such tasks as program development, a company spokesman said.

The Perkin-Elmer Cobol includes indexed I/O support for DMS/32, screen formatting through CALLs to ITC, backing for both the PERFORM and COMPUTE verbs and support for complex conditionals.

Reliance costs $12,500 or $6,250 and $315/mo, but both the Cobol compiler and DMS/32 are available separately for $5,000 and $6,000, respectively.

Perkin-Elmer also introduced an RPG-II facility it described as "highly compatible" with IBM's System/3 RPG-II. Called an adjunct to Reliance, it costs $2,500.

Software at NCC

NCR Operating System

Also in the Coliseum but at the other end of the equipment spectrum, NCR Corp. demonstrated the most elaborate operating system it has yet offered users of its large-scale 8585 processors: a multi-processor version of its virtual-oriented VRX software.

Other products introduced included an enhanced version of SAS, the statistical analysis system from SAS Institute, Inc. SAS-79 supports structured programming with such features as the DO...END and IF... THEN...ELSE statements, along with array processing statements.

SAS-79 performs canonical correlation, a multivariate technique for investigating the relationship between two groups of variables. It also supports a time-series analysis, including the means of finding lags and differences in the value of a variable.

Vsam Enhancement

DASD Corp. was telling show attendees about a Vsam performance enhancement tool called IV$AM. This product cuts overhead normally associated with that particular access method with only "minor modification" — never defined by the vendor — to the user's Cobol programs. The package is so recent, however, that literature for it was not yet available.

MPGswift, the teleprocessing monitor from GBA International (now part of the Mathematica Products Group of Mathematica Inc.) was introduced by its new vendor. The package includes support for IBM 2260 and 3270 as well as Teletype Corp. terminals and works with many of the more common access methods and data base management systems (DBMS).

Information Processing, Inc. used its space at NCC to announce Version 3.2 of its Blis/Cobol compiler. This version includes more communications support than earlier releases.

Running on a variety of minicomputers, the combination operating system/language processor now backs communications to IBM 2780, 3780 and 3270 terminals as well as Burroughs Corp. TC500 units, a spokesman said.

English Entries

A number of companies from England or their U.S. affiliates also showed a rash of new products. At the top of the list of those with picturesque names was Guts — the Gothenburg University Time-sharing System — which has been introduced by Altergo Software Ltd. in England but not yet by Altergo Software, Inc. in the U.S.

CAP-CPP, Inc. announced Autoindex, a retrieval/query facility that runs with the company's Microcobol system. Autoindex manages the storage of data in user-defined formats and on floppy disks in addition to the commands needed to get the information back on the CRT screen or in printed form on a hard-copy unit.

Micro Focus Ltd. announced Version 4 of its CIS Cobol for microcomputers. At the present time, the software is intended for use on 8080- and Z80-based systems and is being offered by Intel Corp. as well as by Micro Focus.

The compiler is written in ANS Cobol 74 and produces object code from source code in that language. The object code for the compiler, from Intel, costs $995. Source code is extra.

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Communications Products at NCC

• Computer Devices, Inc. showed off two products at the National Computer Conference last week — a thermal printer and a protable terminal with minifloppy disks and 1.4M bytes of random-access memory.

The Q3 thermal printer offers software- and switch-selectable 80- and/or 132-column print formats on 8.75-in. paper. The 5 by 7 dot matrix printer has the optional capability of plotting with a resolution of 60 dot/in. vertically and 57 dot/in. horizontally. It costs $300.

The Miniterm Model 1206/DOS can accommodate up to four Minifile double-density, minifloppy disk drives for random and sequential access of up to 1.44M bytes. Each Minifile is available in either single- or double-headed configurations and accepts 5.25-in. diskettes capable of providing 180 to 360K bytes of storage.

The system also includes a disk operating system, integral disk controller, a 64K-byte processor programmable in Basic, a 50 char./sec thermal printer, 128-character Ascii keyboard, minicassette storage and RS-232C or acoustically coupled communications interface — all in one package.

The Model 1206/DOS costs $5,485, with a 180K byte single-sided disk priced at $1,590.

• Codex Corp. introduced three communications front-end processors — the 6520, 6540 and 6560. The units support IBM 360, 370 and Series 30 and are plug-compatible replacements for IBM 270X and 370X controllers operating in the Emulation Program mode.

The smallest processor, the 6520, can connect up to four processors and three 256K-byte disk, expandable in 8K-byte increments. The system, which supports 240 lines, can be ordered with a maximum of 64K bytes of memory, depending on how much is needed to handle processing tasks, a Codex spokesman said.

Throughput capacity was quoted at more than 200,000 char/sec for bit serial communications. Transmission speeds for asynchronous traffic range from 50- to 9,600 bit/sec and between 1,200- and 230. 4K bits/sec for syncronous traffic.

Terminals can transmit at faster speeds if fewer terminals are transmitting at any one time, the spokesman noted.

The 6240 and 6260 can both support 800 lines and have a maximum available memory of 512K bytes. Both accommodate seven host mainframes and seven 256K-byte disks.

The 6560 has a throughput capacity of 400,000 char./sec, double the throughput of the 6540.

The front ends recognize different speeds of terminals and any one terminal can connect to all applications programs. All three systems incorporate an autopolling feature. The three systems range in price from $50,000 to $200,000.

• The Computer Transceiver Systems, Inc. Execuport 4000G portable teleprinter incorporates the features of the company's 4000 line of terminals, but adds plotting ability.

Weighing in at 16 pounds, the 4000G can print up to 136 positions on papers as wide as 14-7/8 in. Dot resolution is 24 vertical by 10 horizontal prints to an inch. A set of 18 special characters is available.

The Execuport 4000G transmits at switch-selectable speeds of 110- or 300 bit/sec and operates at half duplex, full duplex or locally. The terminal incorporates a built-in acoustic coupler that is said to be more sensitive and incorporates more effective sound isolation than competing systems.

The 4000G is priced at $4,695.

• The Model DM30 multipage editing CRT terminal is Beehive International, Inc.'s latest addition to the Micro Bee family. The standard DM30 provides for two pages of display memory with scrolling and paging controls and offers a detachable keyboard case, a company spokesman said.

Screen presentation is 24 lines by 80 characters, with the 25th line utilized as a status line providing prompts on the terminal and system modes, error messages and a real-time clock.

Full editing and formatting facilities are said to be provided thoughout the display memory including selectable entry parameters for alphanumeric, total fill, must fill, constant and modified mode.

Communications facilities via the serial asynchronous RS-232C main and auxiliary port are speed-selectable via software or hardware switches up to 19.2 K bit/sec, the spokesman said. An internal switch-selectable protocol permits the passing of data between ports at different speeds while maintaining local data entry facilities for the operator.

The terminal features such user-oriented capabilities as forms build and page dump modes, reportedly permitting the user to locally generate formats and screens previously requiring programming.

In addition to the DM30, Beehive introduced emulators for the Data General Corp. Dasher 6053, the Digital Equipment Corp. VT52 and the Microdata Corp. Prism terminals for use with Beehive's Model DM1S terminal.

The emulators cost between $120 and $150 on a per-terminal basis.

• Besides additional capabilities for its Intershake interactive protocol tester, Atlantic Research Corp. introduced a combination breakout box and interface tester.

The Model J version of the Intershake is said to provide a 25% increase in its instruction set, reportedly enhancing its power and speed of programming.

A field-installable upgrade kit, the DTM-OPT-91 consists of seven programmable read-only memories (Prom) and a Prom pulling tool kit and is available for most existing models of the Intershake II, a spokesman said.

The new functions allow the testing of high-level protocols by providing 16 additional conditional branches on key data communications parameters, he added. Parameters include those required by bit-oriented and packet network protocols.

Besides the additional capabilities offered by the Model J, the unit offers such features as interactive testing of Ipars, X.25 (levels 1, 2, 3 and 4), Systems Network Architecture, packet networks, IBM 3270, 3275 and 3276 terminals, the Teletype Corp. 4540 terminal and transparent bisync, including protocol simulation and real-time calculation of CRC.

Measurements can be performed at data rates up to 230K byte/sec. Delivery of the Model J will begin in August; the unit costs $11,450.

The Model IFT-680, also shown by Atlantic Research, is a combination breakout box and interface analyzer designed for testing the CCITT V.35 interface between modem and terminal. A built-in clock is said to enable the IFT-680 to operate as a modem eliminator by direct cross-patching on the unit's front panel.

The unit costs $1,175 from Atlantic Research Corp.'s Teleproducts Division, 5390 Cherokee Ave., Alexandria, Va. 22314.

• Digitech Data Industries, Inc. used NCC to introduce its Encore 100, a monitoring and diagnostic instrument for telecommunication systems. Incorporating a 9-in. CRT, the Encore 100 can sample and read telecommunications lines at speeds up to 9,600 bit/sec, the firm said, and can store up to 500,000 bytes of captured data.

Capable of operating in packet-switched, bit-oriented protocol environments such as X.25, the system operates in three modes: as a nonintrusive data line monitor, as a multilevel interactive hardware and software simulator and as a traffic efficiency analyzer.

The device sells for $19,500, the Ridgefield, Conn., firm said.

• Northern Telecom, Inc. introduced a front-feed attachment for all Sprinter series bi-directional matrix printers. The unit is interchangeable with the standard tractor-feed module.

Cut forms such as ledgers, checks, receipts and invoices can be processed with up to five carbon copies. The front-feed option will accept paper widths from 5.9- to 11.5 in. and paper lengths from 3- to 14 in. The first printable line is 1.5 in. from the top of the form.

The option costs $2,000 and the Sprinter costs $3,860. Both units will interface with Northern's 300 and 400 series equipment.

• Users can reportedly observe network traffic without interrupting normal communications by using a passive, noninteractive unit from Universal Data Systems, Inc. (UDS).

The Comtest 100 provides a 3,500-character storage buffer and 28 user-specified parameters, including 12 alternate field selections, 11 yes/no machine commands and five data entry fields, according to a UDS spokesman.

Available with or without an integral, 5-in. terminal, the unit offers forward or reverse scroll in the "read buffer" mode and operates at 50- to 19.2K bit/sec in full- or half-duplex mode.

To operate with the Comtest 100, UDS also introduced an optional disk buffer that holds up to 2.867M bits on four surfaces, the spokesman said. The buffer uses standard 5-in. minifloppy disks and records 19.2K bit/sec.

The Comtest 100 costs $3,300 and will be available in August, while accompanying disk buffer sells for $3,550 (dual-drive version) or $2,424 (single-drive version) and will be available in October.

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Products at NCC

• An 8.25-in., fixed-media disk drive, a system designed to run the Pascal language and an upgrade for disk capacity were introduced by Pertec Computer Corp. at the National Computer Conference last week.

The disk drives, said by the company to be compatible with 8-in. floppy disk drives and capable of storing 20M bytes, will sell for approximately $1,800 each in OEM quantities when deliveries begin in the fourth quarter.

The Pascal system, which the company is calling its Pascal Blaiser in a play on the name of the French mathematician and inventor, consists of a single-board Western Digital Corp. WD/9000 Pascal Microengine housed in a Pertec FD 3812 disk drive, as well as the Pascal Operating System, Version III.0.

The system will sell for $5,995 in single quantities when deliveries start in the last quarter of the year.

The last product announcement from the California OEM company enables users to expand peripheral disk capacity by up to 40M bytes, as well as to attach up to four additional CRTs to the company's PCC 2000 systems. The upgrades, which can be performed on-site or ordered with PCC 2000 systems, are the first of a series, company officials indicated.

A detailed list of prices for the upgraded system was not available at press time, but officials said prices generally begin at about $12,000 for the simpler systems.

• Three memory systems were announced by Ampex Corp. The ARM-10M extended memory for Digital Equipment Corp.'s Decsystem-10 is said to provide 1.3 msec data access speed, random-access operation, maximum program flexibility and all-electronic parts.

An alternative to high-speed swapping devices for KL and KI processors, the ARM-10M costs $195,000 for 2M words and $130,000 for 1M word, a spokesman said.

The ARM-303X memory for use with IBM Series 30 mainframes is said to feature 16K random-access memory technology, 16M-byte capability for all processors and lower power requirements and lower heat dissipation. It costs $50,000 per 1M byte, with a special offer to the first 10 customers, who will pay $30,000 per 1M byte.

The ARM-1280 add-on memory was designed to be used with Data General Corp.'s Nova 800, Nova 1200 and D116 computers. While the memory has been offered in 16K bytes, it is now available in 32K words on a single board.

The ARM-1280 features a switch-selectable cycle speed to match the CPU model, plugs into any memory slot and operates in any address field including extensions beyond 32K, the spokesman claimed. The unit costs $2,300 for 32K from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

• Tandem Computers, Inc. boosted the language and data communications capabilities of its Non-stop mainframe system with the announcement of four additional products.

The additions include an Ansi 77-compatible Mumps language that integrates with the firm's Guardian operating system; two features that provide IBM 3270 support for the company's Axcess package support system; and a $2,500 license fee for Tandem's X25/-AM communications standard.

At the same time, the firm announced price reductions for its memory and disk subsystems. With the cuts, the price of Tandem's 384K-byte memory subsystem has dropped 41% to $12,800, while the price of the company's 94K-byte subsystem has fallen 38% to $4,500.

On the other hand, the firm boosted the license fee for its Guardian operating system to $5,000. The price hike takes effect July 1, according to a spokesman.

Available in January 1980, the Mumps language sells for a $7,000 license fee with a $2,000 microcode charge per processor. The two 3270 support features — dubbed the AM/3270 and TR/3271 — cost $2,000 and $4,000, respectively, and will become available this October.

• Memorex Corp. introduced an 8-in. rigid disk drive for the OEM market. The Memorex 101 is the first member of a family of 8-in. rigid disk drives.

The 101 uses Winchester-type technology.

The module fits into a flexible disk drive envelope and provides 11.7M bytes of storage capacity on two disks, Memorex stated. Among the unit's other capacities are 6,100 bit/in. and 195 track/in.

The 101 is priced at $1,500 in quantities of 100. First shipments are expected next April.

• Dataram Corp.'s Bulk Semi system, which has a capacity of 8M bytes in a single 15.75-in. chassis, is billed by the company as one of a number of "industry firsts" introduced here at the show.

Bulk Semi consists of a controller board and up to 16 256K-byte array boards. It was designed as a semiconductor memory for a wide range of main memory or peripheral storage applications.

Each array board costs $6,500; however, the total price of the Bulk Semi as a system depends on the interface used, a spokesman said.

The Bulk Semi can emulate many kinds of disk systems and can be used as the main memory of a Digital Equipment Corp. PDP-11/70. The unit can be sold without an interface if the customer decides to develop a special interface.

Dataram also offered its S33 SMD controller, said to be the first storage module controller for the PDP-11 to maintain compatibility and to be packaged on a single DEC hex board. The cost of the S33 was quoted at $5,400.

• Techtran Industries, Inc. introduced a twin data cassette and a microdisk with unlimited editing.

The dual cassette unit, which sells for $2,295, offers simultaneous reading and writing on both disks. It has a spill-over function that will activate a second drive when the tape runs out in the first drive, according to Techtran.

The Techtran microdisk 951 costs $1,995. Techtran is located at 200 Commerce Drive, Rochester, N.Y. 14523.

• The Pincomm 70S semiconductor memory module introduced by Applied Magnetics Corp. was designed to provide 64K words of storage on a single printer circuit card that is hardware- and software-compatible with Digital Equipment Corp. PDP-11/70 computers using the MK-11 memory system chassis.

The unit uses 16K by 1 MOS storage devices and is configured as a 64K-word memory, comprised of 39-bit words, according to the firm.

The Pincomm 70S costs $4,985.

• A combination moving-head and fixed-head disk drive made its debut at Alpha Data, Inc.'s booth at NCC.

The Atlas is said to have a moving-head capacity of 10M or 20M bytes and an optional fixed-head capacity of 256K or 512K bytes, with an average cylinder access time of 38 msec.

With a 4.2 MHz data transfer rate, the Atlas employs one or two metal-plated disks on which ride four or eight moving heads driven by a rotary actuator, plus up to 32 fixed data and four clock heads.

The Atlas costs $3,000 to $3,800, depending on quantity and capacity. Alpha Data is located at 20750 Marilla St., Chatsworth, Calif. 91311.

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Office Management Systems: Vital to Survival

By Tom Henkel
CW Staff

NEW YORK — The ability to develop and plan a good office management system will be the key to survival in the 1980s. That's the opinion of Frederick R. Amport Jr., director of information management for A.T. Kearney, Inc., a management consulting firm.

With inflation and rising labor costs, Amport said, an effective and productive communications system will be essential for medium- and large-scale offices.

The office of the '80s will have in-office CPUs and more stand-alone hardware such as expanded word processors and high-speed printers and more highly skilled personnel to run them, he told a National Computer Conference audience here last week.

Amport said now is the time for office managers to sit down and analyze their cost compared with the production rate. In the past 20 years, salaries have doubled, while production rates have only increased by a few percentage points.

Programs to increase productivity have to be implemented and remain in effect, but many companies initiate productivity plans that work for a while and then drop off when employees lose interest. One of the keys to prolonged productivity is the use of improved communications systems and expanded data bases for managers, he believes.

"We need a new approach to productivity," Amport said. Productivity at the administrative, secretarial and service levels is getting the least attention in business today. Reversal of that trend will be essential to economic survival in the '80s.

In order to prepare for the future, current office functions must be analyzed on the management and service levels. On the management side, Amport said cost and improved systems and organizational techniques rank highest on the list of factors to be analyzed.

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Indirect costs such as waste and the maintenance of personnel in outdated jobs are "the major contributors to overall rising costs," Amport said. But time constraints, scheduling, planning and cost over time are also important considerations.

Four Development Stages

Amport forsees four stages of development leading to what he directed as the office of the '80s.

The first two stages, which includes the acquisition of communications processors, a high-speed printer and an in-office CPU, is already a reality for some offices.

The third stage include the acquistion of an executive office terminal that would allow the executive to communicate faster and more effectively with his staff. The terminal would also be connected to an easily accessible data base to give the executive fast access to records and data.

The final stage would offer more remote and stand-alone hardware. "In the 1980s, the office will be an automated office," Amport said. The use of more technical equipment will require better trained office personnel.

Suggested Remedies

Frequent reorganization and a redelegation of duties will be one of the key ways to make an office more profitable, but one of the major problems in reorganizing is the employee's resistance to change, Amport said.

Management must recognize and take advantage of new resources in order to survive. Amport said companies must use data output and communications systems to serve specific functions rather than the general needs of the organization.

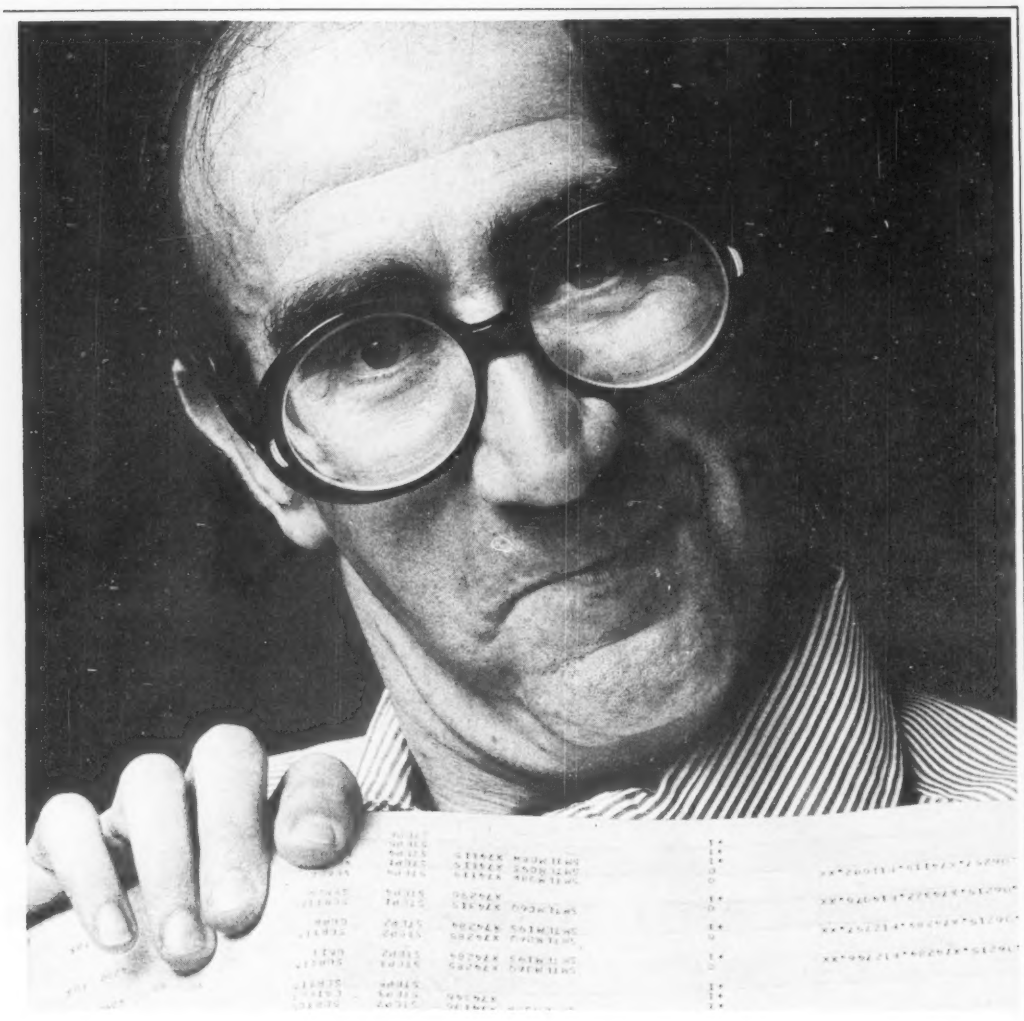
"People are the highest cost," he noted. Companies must make better use of their hardware to cut down on those costs.

From the service standpoint, the priorities are different, but the same basic requirements apply.

Management thinks of itself first and then of what the competition is doing. The systems, organization and costs are less important. In this situation, Amport said, some companies waste money on systems they don't need just because the competition bought one.

The consultant recommended that companies evaluate their current and projected needs and plan office development for the future. Amport cited Grants Department Stores as an example of a company that failed because of inadequate office management and neglected overhead costs.

In the '80s, Amport said, "you will either grow or fail." There will be more cases like Grants if office management is not carried out properly.



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In High-Level Positions

Role Model Dearth Held Block to Women DPers

By Marguerite Zientara
CW Staff

NEW YORK — The lack of female role models in high-level administrative and management positions in the DP community is one of the major factors holding women back from aspiring to fill such jobs.

That was the consensus of a panel of female computer professionals at "The Status of Women and Minorities in Computing," a session at the National Computer Conference here last week.

While very few statistics are available on the actual numbers of women employed in the various levels of DP jobs, what statistical evidence there is points to a dismally low percentage of middle and upper management positions held by women, according to Carolyn Landis, director of membership services at Educom in Princeton, N.J.

Considering college and university environments, Landis noted that the Association for Computing Machinery (ACM) directory of such facts indicated that for 1979, while the computer science department chairpeople were men, only 6.4% were women.

Out of 1,300 DP centers polled by ACM in 1979, 5.2% indicated that women held the post of DP director, as compared with 89% of men. It is fair to conclude, Landis indicated, that the women who hold these jobs feel isolated in their positions and have little contact with female colleagues at the same level.

Greater Chance of Success

While women obviously are not well represented in upper level jobs in the DP arena, they still probably have a greater chance of succeeding in DP than in fields such as physical science, mathematical science or engineering, according to Helen Wood, a computer scientist with the National Bureau of Standards.

According to National Science Foundation data, a larger percentage of women are working in DP than in any of those fields, Wood noted. In addition, data processing offers the smallest difference between male and female salaries for similar work, she indicated.

Although totally equal salaries for men and women would be ideal, the present male-female differential in DP is $2,300 annually, compared with about $8,000 in other technical fields, Wood said. In addition, women in DP are being offered $10 a month more in starting salaries than men.

Area of Opportunity

One area that is wide open for women who want to work in technical jobs is medical science computing, according to Lynn Peterson, assistant director of the medical computer science department at the University of Texas Health Science Center in Dallas.

The area would appear to anyone interested in both an academic and service type of role career, Peterson said.

While the number of students and the number of women in computer science academic programs have both increased dramatically since 1970, the number of women in baccalaureate, masters' and doctoral programs in computer science decreases as the level of progress increases, Peterson said. She attributed this to the lack of role models for women in high-level jobs, noting that in 1974, 99% of all the people employed in data entry jobs were women.

Nevertheless, a 1975 survey concerning women's attitudes toward their careers showed 64% felt they had opportunities equal to men's in earning, 68% felt equality in promotion possibilities and 72% felt overall equality.

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In addition, 71% felt they had an opportunity to hold a senior-level job and 61% felt they had as much opportunity as men to hold a management job.

Peterson urged all professional women in DP to remain visible to other women who might use them as role models. Female DP executives should also encourage women who have an interest in fields that could lead to DP, she said.

Blacks in DP

Although the first three speakers discussed the problems of women in DP, the final session speaker, Cynthia Harvey, addressed the subject of minorities in DP, particularly blacks. Harvey is an assistant professor in the mathematics department at Morgan State University in Baltimore, Md., where she teaches computer science.

Although women have a problem with a lack of statistics concerning employment in DP, statistics on blacks are practically nonexistent — "It never comes to 1% of anything, so nothing ever shows."

Among reasons Harvey cited for blacks' nonparticipation in the field are the lack of role models, the lack of public school guidance in that area, the negative images that exist about blacks' abilities in the sciences and a lack of emphasis on science and the use of computers in black colleges.

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Information Officer Not Here Yet, Panel Agrees

By Howard A. Karten
CW Staff

NEW YORK — Although the U.S. economy is dominated more and more by "information processing" activities, few organizations in the country have formally established the position of "information officer." This situation exists despite the lower cost of DP hardware and the importance of information to organizations.

This was the view of several panelists at a session last week of the National Computer Conference devoted to exploring the question, "The Information Officer: Fact or Fancy?"

Responding to the question of whether information officers exist in organizations, Paul A. Strassmann, vice-president for the Information Products Group of Xerox Corp., said flatly, "It's fancy."

He cited a recent study conducted by the accounting firm, Peat, Marwick, Mitchell & Co., which found that more than 50% of all word processing equipment purchased by major U.S. organizations was not selected by DP personnel. "And that's in the largest companies," which presumably have more expertise, as well as more money, to apply to hardware selection.

Fewer than 20% of company expansion plans are for environments that will be conducive to an information-oriented technology, Strassman said.

Misanthropic DPers?

The reason for this lack of stress on the coming "information age" may be partly because of the personalities of DP managers and workers, according to J. Daniel Couger, professor of computer and management science at the University of Colorado.

Couger's argument was that people naturally think of DP in connection with information processing or management. A recent study of DP employees found that most have low needs for social interaction; in fact, the social interaction needs of DPers were the lowest of any professional group studied.

Therefore, DP managers — especially if they have been promoted into management ranks and if they share this trait — are likely to stand out "like a sore thumb" in organizations. They don't like meetings; they appear not to want to participate in the business of an organization.

But participating in a business is crucial for managers. Since the users of the equipment and information are not experts in information processing, there is a void.

The answers, Couger suggested, might be more formal training in social interaction and similar skills for DPers. Despite much technical training in business and DP, there is little concentration in the behavioral areas, he noted.

Group Accommodation

The panelists appeared to disagree on precise definitions and terms, since some modified their positions after disagreements with co-panelists. For example, Frank J. Carr, commissioner for the Automated Data and Telecommunications Service of the General Services Administration (GSA), initially seemed to be advocating that information officers come from the ranks of DPers or, at least, those familiar with DP concepts.

Strassmann then pointed to an historical situation to support his contention that this situation would not necessarily come to pass, and Carr modified his position.

At the time of the industrial revolution in England, people believed that managers of the new enterprises would come from the ranks of the engineers, Strassman said. But the managers of these institutions turned out to be capitalists — i.e., businessmen and generalists — and not technicians. A similar situation could easily occur in the future, Strassman predicted.

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And There Was Light?

NEW YORK — Panelists and a number of information specialists at one National Computer Conference session here last week might be tempted to bring candles to their next DP meeting.

As speaker Robert Bezilla lectured on the benefits of computer-assisted interactions and advanced future technology, the room was suddenly plunged into darkness. A number of people groped for matches and cigarette lighters, shedding a glimmer of light, while a member of the audience used the slide projector to spotlight Bezilla as he continued.

However, one of the panelists used the momentary blackout to his advantage.

He pointed out that it was just a graphic way of showing just how much "in the dark" DP people are when it comes to computerized conferencing.

CW Photo by A. Dooley

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Visual Cues Eliminated

Experts Agree DP Conferencing Imperfect

By Tim Scannell
CW Staff

NEW YORK — While computerized conferencing offers users the chance to be heard in more than one place at the same time and by a greater number of people, a number of social and technical drawbacks inhibit its use, a group of experts agreed at the National Computer Conference here last week.

Standard, face-to-face communication is basically limited to one space at one time and is a sequential form of exchanging ideas, Robert Bezilla, an information specialist with Benson and Benson, Inc. and a teleconferencing advocate, stated. But unlike computer-aided interchanges, personal conversations allow people to make use of certain social signals and "cuing" techniques to classify and deal with other people.

These social signals establish personality clues and can cause relationships to change as a person's outside identity is revealed, Bezilla said. Without nonverbal cues, identities can be hidden and people risk the chance of stumbling and struggling through a conversation on a one-way communicative street.

Counteracting Prejudice

However, anonymity and ignorance of what the person to whom you are speaking looks like does have certain benefits, Bezilla explained. For instance, long-distance and detached conversations can prevent the stereotyping of an individual according to personal appearance. The user of such a system can define roles that are appropriate to the situation and not to professional or personal stature.

Presently, involved with the electronic information exchange system (Eies), a teleconferencing project funded by the National Science Foundation (NSF), Bezilla pointed out that computer-aided communications can be used as a tool for temporarily redefining a user's personality. Because conversations aren't influenced by such things as age, social position or business titles, the system can counteract prejudice and allow a "freer and more productive group process," Bezilla noted.

Valarie C. Lamont in Participation Systems of Portland, Maine, agreed that people are hesitant to approach and use a computerized conferencing system at first because it is an unorthodox means of communicating. But given a training period of at least two months and a basic rundown of the logic behind the technology, people can accept it. Most office workers aren't actually afraid of the system itself but are worried about the way the technology will integrate into their work flow and affect the office environment.

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Lamont is part of another NSF project aimed at bringing the benefits of computerized conferencing to state and federal legislators. Called Legitech, Lamont's system ties the legislative bodies of 15 states as well as seven or eight independent federal groups such as the Department of Transportation and the Environmental Protection Agency. The purpose of the project is to facilitate the exchange of scientific and technical information among the different agencies, Lamont said.

Designed for short messages, the system can handle inquiries and responses and head people in the right direction if certain data is unavailable. Questions input to the system are flashed to the terminals of all the users, and answers are not limited to select agencies or members. The system has not only saved a lot of research time but has led to a sort of regional camaraderie among members, Lamont explained.

Murray Turoff of the New Jersey Institute of Technology and the designer of the Eies and other computer conferencing systems admits that using a machine to communicate between individuals is "not so neat." The system's design is based on the natural laws governing human behavior, which are not yet fully understood.

CW Photo by A. Dooley

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CW

Lawyers, DP a Problematic Mix, Session Told

By Jake Kirchner
CW Washington Bureau

NEW YORK — The problem of adapting modern information technology to organizations consisting largely of attorneys, such as the federal courts, Congress and the White House, is a slow, agonizing one, attendees were told at the National Computer Conference here last week. As one panel member described the task, "the work dynamics of a White House aide must be akin to those of a channel swimmer caught in a hurricane."

The approach taken by those who must consider these work dynamics when automating the legal process has been to keep the attorneys out of the DP room as much as possible. "Our goal was to keep the courts from having to acquire computer expertise," Charles Nihan, director of systems development for the federal court system, said.

Nihan explained that automation did not come to the federal courts until 1974, when the Federal Judicial Center began developing centralized support systems for the 95 trial and 11 appellate courts that make up the U.S. federal judiciary.

The center was created in 1967 and is run by a seven-man board presently headed by Chief Justice Warren Burger. Because all the federal courts are independent, reaching agreement on how to centralize their DP support was "a long and painful process," Nihan said.

The courts now use 350 terminals in an on-line, interactive system that last month recorded 46,000 hours of terminal time and performed 29,000 jobs, he reported. The system not only schedules court dockets but is also used for computer-assisted transcription and legal research activities.

"In office automation, we decided to jump in with both feet," Nihan said, describing a current experimental program of fully automated court management in the Third Circuit Appellate Court. The court, which has jurisdiction in Pennsylvania, New Jersey and Delaware, has experienced a 52% reduction in the time it takes to produce judicial opinions, according to Nihan.

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Although the courts "got off to a very slow and very late start," Nihan said the federal court system now has 55 DP applications either in place or being developed. Applications range from jury selection to a number of management and research systems such as personnel systems, property management systems and use of numerous commercial statistical packages.

Questions of Confidentiality

A major concern in automating legal functions is to maintain the confidentiality of the lawyer-client relationship. This was of particular importance to the U.S. Senate's Legislative Counsel's Office, which has been using computers for only three years. The office assists committees and individual senators in drafting legislation.

As described by the head of that office, Harry Littel, one office attorney might be advising a particular senator about drafting legislation on one subject while another member of the office helps a second senator produce opposing legislation. The confidentiality of those conversations was a major factor during development of the office's automated systems.

The CRTs in the office are hardwired to a secure computer installation on Capitol Hill and only the office's 15 attorneys and seven support staff members have physical access to the equipment, according to Littel.

Littel said it took him a while to get past the belief that "computers and lawyers don't mix," but the large number of bills and measures introduced in the Senate every year has made automation vital to the Legislative Counsel's office. The principal application is word processing, making considerable use of text editing and revision capabilities, he said.

The staff attorneys are also beginning to use a commercially available data base of the U.S. Code for research purposes.

White House a 'Challenge'

If it is true, as suggested during last week's session, that "the ultimate goal of most DP managers is to report directly to the president," then panel member Richard Harden has made it to the top.

However, Harden, who is head of the White House Office of Administration, said he found the White House a challenge to automation. The challenge consisted mainly of an almost complete lack of modern technology. The Executive Office had "plenty of fertile ground for innovation and information technology" when the Carter Administration took office, he said.

He described the White House as a "fascinating place" for information systems professionals because the "main product" of the staff is information.

The White House now has 15 "significant applications that we've developed over the last two or three years," he said. Harden estimated there is a potential for 40 to 50 different DP applications in the White House, such as word processing, correspondence management, personnel and more sophisticated types of management systems.

Harden's office has approached its task by looking at the job responsibilities of individual White House staffers and determining "the pressure points" of their work. The available resources are then studied and applications developed or obtained commercially.

Harden said they have drawn on the expertise of the government itself in DP, receiving help from, among others, the Defense Department, the National Aeronautics and Space Administration and the National Bureau of Standards. "Our motto: we never do anything ourselves that we can find someone else to do for us.

"We've decentralized to a large degree the collection and management of information," he continued. As an example, he noted that the White House "Congressional Liaison Activity Support System," which tracks congressional proposals, is updated by the dozen or so agencies that are tied into it.

One concern about automating the Executive Branch raised during the session is that in most organizations, information is power and those who control information wield great influence. Harden said there is little chance of an information power war between the White House and Congress because the information in the present White House systems is public record and consists mostly of raw data.

The information to a certain degree has been submitted to policy analysis, he explained, but not political interpretation at this time. Although that could be a factor in the future, he conceded, the purpose right now is "to communicate useful but not sensitive information."

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Bad Experiences Related

DP Managers Warned About Unions' Spread

By John Whitmarsh
CW Staff

NEW YORK — The red flag was raised but few people saw it at a National Computer Conference session here on unions in data processing.

In a sparsely attended seminar on the opening day of NCC, a former DP manager tried to heighten the awareness of DP managers everywhere to the potential for unionization in their departments and to warn them of the consequences of a successful organizing effort.

Richard W. Herzfeld, now director of marketing communications at Computer Devices, Inc., had more than 10 years DP experience in a computer service bureau and with a small Midwest manufacturer.

In a rambling but passionate presentation before a handful of NCC attendees, Herzfeld related his experiences as one man against the union — one man who lost.

Herzfeld was to have been joined on the podium by a labor representative from the American Postal Workers Union (APWU) and a management representative from Honeywell, Inc. Neither representative showed up.

'Touchy Subject'

Herzfeld said he asked five other labor unions to send representatives to the panel, but all refused. He asked two other computer companies to join him, but they too declined.

In his solo appearance, Herzfeld said the lack of representation was one indication of the sensitivity of the topic.

"Unionization is a touchy subject," he said, "and most DP managers don't like to discuss unions for fear that things in their shops will get worse. But I want you to be aware of what can happen if you do have a union."

Herzfeld was manager of DP at a small manufacturing firm in Wisconsin from 1972 to 1976. At the end of four years, he left.

"It was the union that drove me out," he said. "I had no control over my department."

For example, in a union shop, company employees are promoted on the basis of union seniority, not on demonstrated ability, Herzfeld said.

Furthermore, job vacancies are not advertised in a local newspaper but are posted for bidding on all company bulletin boards. The job goes to the senior member bidding for the job, no matter what his qualifications — or lack of them. And, Herzfeld added, if the union member later decides he does not like his new job, he may return to his old one.

Turnover Problems

"People in unions are looking for new jobs and more money," Herzfeld said. But because most of them are not qualified for the jobs they seek, "this causes problems of turnover, particularly in the keypunch entry positions."

It also causes problems of quality. "None of the keypunch operators from the union were as good as those from outside the union," Herzfeld said.

Herzfeld also learned about restrictive job descriptions. "Job descriptions are specific and union employees often refuse to do work that is not in their job description," Herzfeld said.

As a result, he found out that supervisors in a union shop cannot mount tapes or change disk packs, for example.

"No one in a union shop performs

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any job not specifically defined in his job description," Herzfeld related.

He added that, in general, he found a pervasive lack of dedication, determination and satisfaction among union employees.

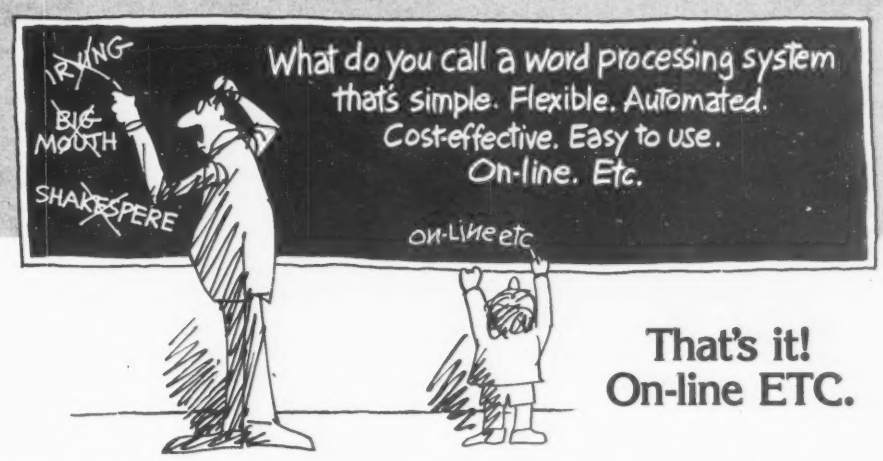
After four years at the company, Herzfeld left and changed careers. "I felt the union destroyed all incentive in that company. Conscientiousness is a mortal sin in a union."

Unions are businesses, Herzfeld explained, and their income is derived in part from membership dues. A union can only grow when its income expands and that means more dues from more union employees. "Unionization is self-propagation, and that's why they come to sign up your employees," Herzfeld said.

Herzfeld was unable to document the extent of unionization in DP. However, he did believe that "very few unions have penetrated DP yet, although some statistics do show that unions are accelerating their efforts to unionize white collar employees, including DPers."

Six unions are currently most active in organizing DP workers, according to Herzfeld. The unions are:

- Office Professional Employees International Union (OPEIU).
- International Brotherhood of Electrical Workers (IBEW).
- Communications Workers of America (CWA).
- Teamsters.
- American Federation of State & Municipal Employees (AFSME).
- American Postal Workers Union.



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Deregulated Industry on the Way, Lawyer Says

By Connie Winkler
CW Staff

NEW YORK — AT&T should get a couple of "get-out-of-jail-free" cards if the communications industry is deregulated, according to an AT&T lawyer.

A five- to 10-year moratorium on antitrust actions against AT&T should be legislated if the industry is deregulated, John S. Luckstone said here last week, and Luckstone believes deregulation is coming. The moratorium would shield AT&T from immediate antitrust suits challenging its large market share.

Luckstone was one of five lawyers involved in a three-hour, nonstop panel at the first day of the National Computer Conference, officially entitled, "Regulation or Antitrust: Competition in the Computer/Communications Marketplace."

Congress will probably deregulate the communications industry, Luckstone said, although Herbert E. Marks reminded the attendees that the Federal Communications Commission (FCC) has announced it will consider the deregulation of common carrier communications. Marks is a partner in the Washington, D.C., law firm of Wilkinson, Cragun & Barker and past president of the Computer Law Association.

All the speakers said they were expressing personal opinions, but Luckstone adopted the AT&T position that Bell Telephone's national telephone network should not be deregulated so that basic service would remain available at a reasonable cost.

"The public interest test should be controlling," Luckstone said about maintaining a monopoly for the telephone network.

"All other services should be freed from regulatory control," he continued. "AT&T believes it can make a profit in all these other areas." Right now, AT&T is being controlled by both the FCC and the Antitrust Division of the Department of Justice, but it cannot serve two masters, Luckstone said.

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The other speakers in mostly classroom lecture fashion gave an historical review of the marriage of the communications industry, traditionally controlled by regulatory agencies, and the computer industry, traditionally controlled by antitrust actions.

The approximately 50 persons at the session learned that the lawyers, being lawyers, had no firm answers and straddled more issues than they answered.

"We are in a mode of massive 'rethink' of what ought to be and what are the ramifications," Marks said about the wedding of computers and communications. "And additional permutations are coming at us rapidly."

Marks warned of the coming impact when the U.S. Postal Service, in its move to regulate first class mail — and coming electronic mail — gets involved in what will be the FCC, Justice Department triangle.

"Whatever the rules are, they are virtually all up for grabs," the past president of the Computer Law Association added.

Compunications' Business

James M. Lyons of the Denver firm of Rothgerber, Appel and Powers was more certain of his position, favoring antitrust legislation litigation as the way to monitor the "compunications" business. "Can a 19th century railroad act regulate a 21st century telecommunications industry world?" he asked. "I think it can."

Although the Sherman Antitrust Act was passed in 1890 to break the railroads' hold on agriculture and the budding industrial revolution in this country, it was not until the 1930s that the act came to fruition.

Transportation, energy and communications are key to the growth and well-being of this country, Lyons said. The Sherman Act has already played a key role in the development of these industries. This should continue, he said, although it may take additional congressional action to maintain competition.

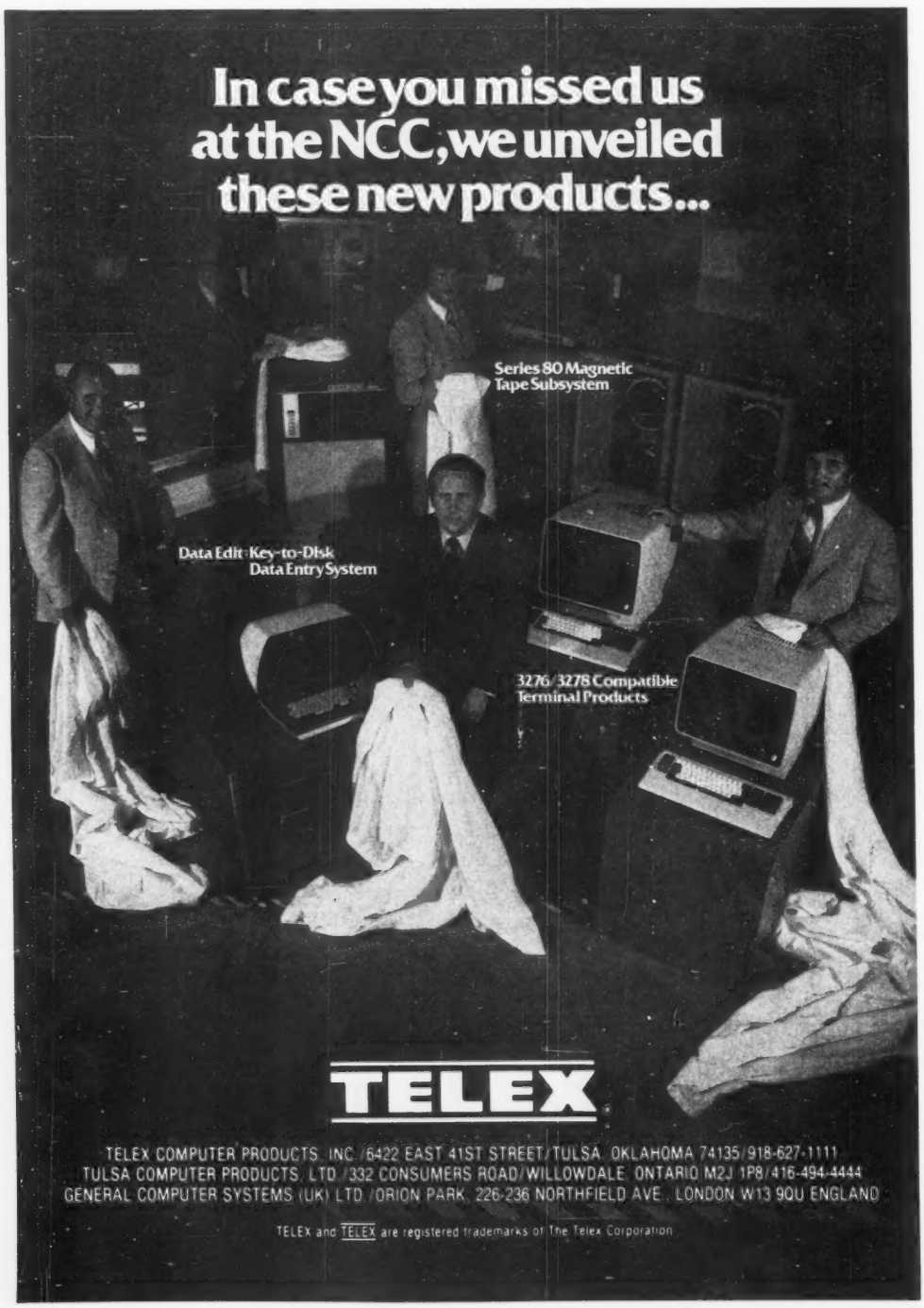
'Rife With Strife'

"No matter what happens, competition policy is going to be rife with strife," according to Edwin B. Spievack of the Washington firm of Cohn and Marks, who was an assistant at the FCC in the 1960s.

Spievack favored a regulation route for the computer/communications industry. After detailing the complicated history of the communications industry regulation, Spievack said it may now be time for a federal national regulatory forum to adjust the terms and conditions which have already been imposed by various — sometimes contradictory — FCC rulings.

Canadian lawyer Gordon E. Kaiser of the Toronto firm of Lang, Michener, Cranston, Farquharson & Wright gave highlights of Canada's experiences with compunications over the last three years as opposed to the 10 years of debate in the U.S. "Americans backed into the fan, while the Canadians walked into the fan," Kaiser said.

He guessed that the telecommunications industry will continue to be controlled by regulation. Only since January 1976 has Canada allowed private antitrust suits, and the regulation route has proven much quicker.



IBM President Warns:

Despite Growth, Trouble Looms for Industry

By Marcy Rosenberg
CW Staff

NEW YORK — Despite the glowing economic and technological progress of the computer industry, "irritating misconceptions" as well as "real problems" loom as potential impediments to future growth.

Like an Indian giver, John R. Opel, IBM president, topped off a recount of impressive industry growth statistics with a note of caution to National Computer Conference attendees here last week about issues that could become "limits to our growth."

Concerns about privacy and data security, international trade restrictions and U.S. government regulation threaten to stunt further DP industry expansion, Opel warned in his keynote address.

He stressed the need for data security, urging the industry to cooperate with legislators and public opinion leaders

CW Photo by A. Dooley
John R. Opel

to work toward insuring privacy. But outside of the privacy domain, Opel called for government to keep hands off DP and communications.

Regulated monopolies — such as common carriers — should be able to enter the data communications industry free of federal control, according to Opel who maintained, "we should let the market do the regulating."

Turning from domestic to foreign government, Opel lashed out at nationalistic policies that shut the door to U.S. and other outside suppliers and stifle competition. Speaking in regard to countries that "try to favor their own indigenous information processing industry," he asserted that "everyone is best served by as much competition as possible."

'Computer as Villain'

Besides these concrete issues, Opel touched on a less tangible block to industry growth — the misconception of "computer as villain" that he regards as "the stuff from which paranoia is made." He is confident, however, that the basis of this notion will continue to erode each year as computers become more commonplace.

So far, the computer industry has yet to reach the limits of demand for its product, information, and has still to encounter barriers to supply that demand, but Opel hammered home to his audience the need to pay attention to some of these potential obstacles to maintaining the industry's impressive track record.

In terms of physical growth, the computer industry has ballooned from only a handful of manufacturers in the early 1950s to more than 4,000 players today, he pointed out, adding the number of persons working in the field has hit the 750,000 mark.

Revenues have also mushroomed, from "a few million dollars" 25 years ago to a current figure of more than $30 billion domestically.

During the same time frame, the industry's R&D investment has increased 100-fold in the U.S. As if to underscore the fruits of these labors, Opel explained that if the industry's technological progress were applied to

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the airlines, "We could get on an airplane in New York and fly across the country in two seconds."

As an example, he cited advances in circuit logic. Twenty-five years ago, vacuum tubes allowed switching to occur every few seconds, while today's semiconductor technology has boosted that rate to 70 million times a second.

And by the late 1980s, Opel predicted that the amount of logic packed into computer systems will be 100 times greater than 25 years ago — at one-twentieth the cost.

Any number of factors could account for this growth, he suggested, from "super salesmanship" to "fortuitous circumstances — 'dumb luck.'"

There is also the economic interplay of supply and demand, Opel said, but was quick to point out that information is not like "watermelon or corn" where creating more and more can saturate society.

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DP Urged to Set Own Professional Standards

By Tim Scannell
CW Staff

NEW YORK — Like a parentless child, the computer industry is in danger of becoming a heavily regulated ward of the state.

"If DP doesn't come forward and impose professional standards that are reasonable and can be maintained, then the courts and the legislators will," according to Jay T. Westermeier, a Washington, D.C., lawyer and chairman of the American Bar Association's subcommittee on malpractice and professionalism within the computer field.

Speaking before a less-than-capacity crowd here last week at the National Computer Conference, Westermeier and several other industry experts discussed the need for the self-imposed regulation and control of the computer specialist. The DP-oriented lawyer highlighted his talk by focusing on the increasing number of legal suits claiming computer malpractice and programming misrepresentations.

Judges and juries have punished computer firms substantially for not providing adequate documentation, systems analysis or sufficient error-resolution procedures, Westermeier said.

Since specialists in any field are expected to have certain skills and knowledge not possessed by the layman, DP experts have to be accountable for all their computer sins as well as their successes.

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Westermeier noted that the Institute for Certification of Computer Professionals (ICCP), which promotes regulation through education and examinations, is one route the DPer can take to instill professionalism in the computer industry. By regulating and imposing rules from within the industry, "you'll know what is expected from all who live and work in the computer profession," he stated.

Caught in Middle

John K. Swearingen, a fellow panelist and director of technical services for the U.S. Senate, agreed with Westermeier's observations and added that Congress long ago discovered the impact computers, data bases and machine-to-machine communications have on society.

Although the 96th Congress has introduced 64 computer-related measures since January, "the people who pass the laws don't understand us and don't know us," the government director said. Information specialists or the people who are responsible for computer storage are the ones who are caught in the middle of any bad computerized episodes, and it is their reputations that are tarnished, not the machine's.

Association for Computing Machinery (ACM) President Daniel McCracken reiterated the need for industrywide regulation and claimed that the ICCP's two tests, leading to either a Certificate in Data Processing (CDP) or a Certificate in Computer Programming (CCP), are the best way to demonstrate computer competence.

Although some DP professionals support the ICCP's programs because they might limit access to the industry and thereby create a computer elite, McCracken sees the tests as enhancing the constantly battered image of the DP specialist.

As more and more DPers achieve the CDP or CCP title, employers will recognize it as a means of judging qualifications and professional talents. Eventually, salary levels and corporate positions might be based on a specialist's ICCP degree, McCracken said. That goal will never be realized, however, if interest in the exams continues along the same path. Thus far, more than 19,000 DP people, or between 2% and 5% of the worldwide industry, have bothered to take the rigid examination.

DP licensing on a state level might prove helpful in weeding out those that give the industry a bad name, McCracken noted. The ACM president observed that even barbers and beauticians in the state of New York undergo a licensing procedure, and a "badly written [computer] program can hurt the public a lot more than a bad haircut."

Combating Obsolesence

Finally, Paul Armer of the Charles Babbage Institute saw the ICCP exams as a means of combating obsolesence which, he explained, is a problem in the information processing field. Although there is no official survey, a recent study of 2,500 engineers in high-technology communications and the aerospace industry revealed that after 30 years of age, certain professional skills and performance levels seem to dwindle away.

As these skills become less acute or disappear, the door opens for the possibility of making more programming and other DP mistakes, Armer commented.

The ICCP tests can be used as a form of self-assessment to become aware of what one doesn't know. Computer specialists can take either of the exams, go over the errors afterward and then restudy them, Armer said.

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CSC Files Suit Against City of Cleveland

By Tim Scannell
CW Staff

CLEVELAND — Caught in the middle of this city's financial problems, a California-based computer company has filed suit to recover nearly $2 million in unpaid bills from Cleveland and has threatened to bring municipal DP services to a grinding halt.

Computer Sciences Corp. (CSC) is seeking $1.4 million from the city of Cleveland for bills incurred between November 1978 and March 1979 plus an additional $257,000 for each month following that period, according to the suit filed here in the Cuyahoga County Court of Common Pleas. The El Segundo firm has also notified the city that it intends to terminate its facilities management (FM) contract sometime in mid-August.

"We have a contract that calls for these payments, and the city has not paid the outstanding invoices," Jim Furlong, manager of CSC's news bureau, said. "We haven't been successful in getting [Cleveland's] attention to this situation."

Under the FM contract, CSC provides DP for the Cleveland city government, including the police and fire departments, the Department of Health and Welfare, the regional transit authority and the utility department. The computer center's twin IBM 370/158 processors — one leased by the city and the other provided by CSC — are used to prepare payroll checks for the city's approximatly 9,500 employees and to process municipal court records.

If CSC discontinues Cleveland's DP operations, according to a reliable source, it would have a "considerable and even a disasterous impact" on the city. "Obviously, [CSC] prints and distributes and receives all utility bills" to generate city revenues "and maintains all payroll and personnel and financial systems."

Particularly vulnerable to a DP shutdown is the city's police force, which uses the mainframes to support a real-time information system that indicates wanted criminals and outstanding warrants, the source explained.

Meanwhile, since Cleveland defaulted on approximately $15 billion in municipal notes last last year, a number of CSC's FM employees have resigned from the city's computer center. In fact, the DP staff has dwindled from 110 employees to about 65, and more resignations are expected.

Cleveland's financial officers were given 30 days to respond to CSC's suit, and that deadline fell last week. However, CSC's Furlong reported at press time that the city has made no effort to contact his firm.

Cleveland's finance director, Mary Medvick, was unavailable for comment.

Panelists Agree

Small Systems Fueling Growth of Retail Outlets

By Marcia Blumenthal
CW Staff

NEW YORK — The demand for the installation and servicing of the millions of small systems users will acquire in the 1980s is beginning to create a whole new range of entrepreneurial opportunities from the classic system house to the software store.

That was the picture presented by panelists during a recent National Computer Conference session here on "Business and Entrepreneurial Opportunities in Computers."

Discussing the opportunities for starting systems houses, William Gannon, head of Sentry Publishing Co., revealed that 50% of the 1,200 systems houses listed in his company's system house directory were less than five years old. A systems house is a vendor that purchases hardware and adds value to the iron, usually in the form of software. Gannon estimates there are some 2,000 U.S.-based systems houses. And the ranks are swelling. Last year, 200 new systems houses opened their doors. The growth rate of companies in this distribution sector is rising at about 13% annually, Gannon claimed.

Four Categories

Gannon classifies systems houses into four groups: those that concentrate on selling hardware, purchasing iron for inventory and marketing it aggressively; those that buy hardware and develop custom systems for a particular user; companies that buy hardware from many manufacturers and integrate the parts into cohesive systems; and dealers and distributors, which usually carry one manufacturer's products, develop application software and provide installation and start-up services within a specified geographic area.

The last two categories present the greatest opportunities, according to Gannon, and comprise about 50% of the systems houses currently in operation. The key is the diversity of the value-added services that the systems house entrepreneur can provide.

The 1,200 systems houses listed in Gannon's directory last year shipped about 44,000 minicomputer and microcomputer systems. Mini-based systems accounted for about 10,000 units shipped, and micro-based systems represented more than 31,000 of the units shipped.

On the whole, systems houses are not large businesses. Last year, the average supplier sold 32 systems. The typical systems house sells about $1 million worth in products, and 60% of them employ fewer than 25 people, Gannon said.

General business applications accounted for nearly 26% of the systems shipped last year, and 40% of the systems houses are involved in providing small business system applications. Industrial control systems are the second largest type of system sold by these vendors, with 16.1% of the systems shipped in this category.

The aversion of minimakers to labor-intensive tasks such as applications, in part a result of the expense and a shortage of people to do the work, is creating market opportunities for entrepreneurs who can provide the applications and consultative selling required by unsophisticated users.

Unheard of Opportunities

While systems houses concentrate on the mini- or micro-based systems with substantial price tags, the so-called personal computing market presents opportunities that would have been unheard of five years ago.

The personal computing market, once dubbed the hobby market, is really a misnomer, as only 15% of the 250,000 systems sold last year were sold to hobbyists, Dr. Portia Isaacson reported. Isaacson is associated with Electronic Data Systems, Inc., owns a computer store and is chairman of the Association for Computing Machinery's special interest group on personal computing.

Fully 60% of these small-end systems were sold to business, Isaacson noted, adding that currently Radio Shack controls about 50% of the personal computer market, with Apple Computer, Inc. and Commodore Pet holding the other 50% of the market.

By the 1980s, millions of small computers will have been sold, she predicted, and by 1984, these $5,000 small systems will have 100M bytes of storage. With all these systems in the marketplace, problems will arise. "But with problems come opportunities," Isaacson noted.

'Certified Public Programmers'

In particular, there is a tremendous shortage of software for these systems. A software store may be a retailing venture whose time is rapidily approaching. In addition, while small computer makers may offer a limited range of application packages, these packages usually have to be altered somewhat. Enter the software equivalent of the certified public accountant, whom Isaacson called "the certified public programmer."

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These professionals will associate themselves with computer stores and customize programs for the store's customers.

In addition, some enterprising software systems developers may want to sell their systems on a mass market basis, selling programs, for example, for $200 apiece. The need then arises for a distributor which would act much like a record publishing company, Isaacson noted. Software writers could submit their offerings to a distribution company that would determine whether the program will be a "hit." If the offerings look promising, this vendor will market the program for the author.

Isaacson sees computer stores as an appealing opportunity for would-be entrepreneurs because that distribution channel is not heavily saturated. Today, there are about 1,000 computer stores, excluding Radio Shacks, Heathkits or other types of retail outlets owned by manufacturers.

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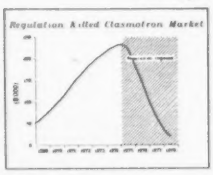

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Improved Management, as Well

Scientists Call for Accurate Biological Data

By Marguerite Zientara
CW Staff

NEW YORK — While computers are being used efficiently and successfully in several different areas of medical and biological research today, there is a crying need for more accurate biological data as well as better data management, scientists agreed at a National Computer Conference session here last week.

"Biological data is unlike any other kind of data because it is typically gathered with the least concern for constant control, and therefore it is bad data," according to Dr. Ed Deland of the UCLA Medical Center, speaking on "Computers in Biological and Medical Simulation."

In spite of the bad data, Deland has been working with computers for the past few years on the problem of maintaining life in heart tissue during surgery. The trick is to keep alive a heart that must be kept in a "quiet and dry" environment during an operation. Such a heart has stopped beating and the blood supply has been cut off, Deland explained.

Using the computer to address the problem, Deland simulates the basic chemical reactions taking place at the capillary level. From that data, he tries to build a systemic model and ultimately to create a generalized behavioral flow diagram.

Typical results of such work might include a graph indicating the potassium intake of the muscle cell over time, Deland indicated. Such a graph would help show to what extent the inner layers of the coronary arteries themselves are supplied with the elements needed to sustain life.

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In addition to lamenting the lack of good data management techniques within the biological research world, Deland decried the computer hardware constraints "that have been limiting us too long. The day will come when they'll give us the computer hardware if we'll just buy the software. Then we will be liberated from concerns about word length and memory size — concerns that are not real, but have been manufactured."

Space Travel Research

Concentrating on benefits that would not be possible without the aid of computers, Dr. Joel Leonard from the National Aeronautics and Space Administration (Nasa) in Houston described the use of simulation techniques in current and future research concerning space travel.

The objectives in studying space travel are twofold, Leonard said. Researchers want to be able to describe man's physical responses to zero gravity, and they want to examine such space-oriented health problems as loss of calcium and motion sickness.

The research going on at Nasa concerning space travel has several unique features, Leonard said. Researchers are working with actual flight data and have established an automated data base with a software analysis system to process it. Medical people and bio-systems analysts make up the interdisciplinary team that manages the data.

Initially, these scientists formulate hypotheses about how the body will react to certain physical conditions in space, Leonard said. From those hypotheses they develop a simulation model, which they then compare to experimental responses.

Simulating Kidneys

Dr. John L. Stephenson of the National Institute of Health in Bethesda, Md., presented a technical description of his work with computer simulations of mammalian kidneys. Most of the work has been done on a Digital Equipment Corp. PDP-10 and an IBM 370 machine with about 100,000 words of memory.

He stressed the importance of being able to change the ratio of, for example, short nephrons to long nephrons in the kidney through simulation — something that cannot be done in reality. "In reality, you're stuck with whatever the ratio is in the animal you're studying," he said.

"The sophistication of simulation models is beginning to approach the complexity of the kidney itself," Stephenson noted. Simulation allows researchers to test hypotheses that have been derived intuitively from simpler models, as well as to see the architectural details of the kidney as they vary from species to species.

Touching on another area, Dr. James E. Randall of Indiana University described the benefits of the microcomputer as a teaching aid, especially to first-year medical students. "Do not confine your impressions of the microcomputer to the idea that it can be used for games and small businesses — it is more than that," Randall told the audience. The microcomputer provides students with mathematical simulations "which give them the feel for an idea very rapidly, as opposed to the analytical process," Randall said.

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PROFILE:
Mike Ehrensberger is manager of the applied systems division of Cincom Systems, Inc. He has 9 years experience with a manufacturing concern where his assignments included experimental work with inventory modeling techniques and the installation of a new manufacturing support system. Since joining Cincom in 1970, Mike has been involved in the support and marketing of Cincom proprietary products.

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VLSI to Boost Dispersal Of DP, SRI Engineer Says

By Marcy Rosenberg
CW Staff

NEW YORK — Very large scale integration (VLSI) technology, which continues to drive down the cost of computing while boosting performance, will create a fundamental reversal from centralized DP to a dispersal of processing power to the user.

"The advent of VLSI and low-cost hardware will allow us to put intelligence where needed and let us implement software more cheaply," according to Stephen W. Miller, senior research engineer at SRI International, one of several panelists speaking on "The Impact of Future Technologies on the Computer Industry" at the National Computer Conference last week.

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By the mid 1980s, Miller predicted, controllers and channels will have the ability to execute high-level commands, relieving a portion of the CPU's control function.

MOS Complexity Traced

Agreeing was panelist David N. Martin, vice-president and general manager of computer products for National Semiconductor Corp. "Distributed processing will come into its own because of the lower cost of processing power and increased power available."

To illustrate, Martin traced MOS memory complexity trends from 1970 and offered price/performance projections through 1985. In 1970, one chip contained 1,000 bits, but that figure has climbed to between 16K and 64K bits per chip today.

By 1985, advances in VLSI will allow storage of 1M bit on a single quarter-inch-square chip at a cost of .01 cent per bit, compared to .1 cent in 1979, he forecast.

Further, he predicted a single chip in 1985 will carry a relative performance equal to an IBM 370/158 high-end mainframe, whereas today, the Intel 8080 comes in at about one-hundredth the performance of the 158.

As computing power becomes cheaper and easier to harness, the DP approach will change from a centralized batch orientation to a more decentralized environment.

However, while the dispersal of computing power makes it easier for users to utilize computers, at the same time it complicates management of the DP function, according to Dr. James G. Rudolph, vice-president of Gnostic Concepts.

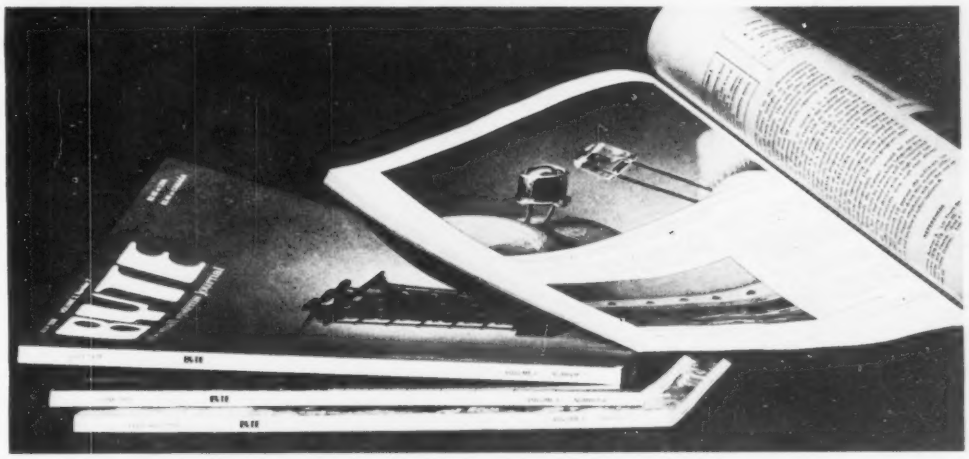
Distributing power will create a dichotomy, — simplicity in utilization but complexity in integration — because information processing is no longer under one roof, or under one person's control.

As a result, Rudolph stated, users will have to structure management to cope with the dichotomy. Compounding the problem, a distributed network often involves different offices and the need to integrate systems from multiple vendors. Therefore, some centralized control may still be required to support a decentralized DP network.

CW Photos by A. Dooley

Jean Claude Fortin (far left) discusses new Data Printer Corp. Model 3901 printer with Joseph Konkel and Paul Kwesnick.

How It Rained!



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Bigger, Better Data Base Machines Called Sign of the Times for '80s

By Tom Henkel
CW Staff

NEW YORK — "The data base machines are coming." But when, how and will they work when they get here?

Panelists at a National Computer Conference session here last week agreed that bigger and bigger data base machines will be the sign of the 1980s. Hardware improvements that make communication between dissimilar computers possible and an increased demand for expanded control of ever-growing data bases are speeding up research toward a functional data base machine, according to session leader Theodore H. Bonn, director of Digital Laboratories at Sperry Research Center.

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From the developer's point of view, a working data base machine is just around the corner.

Robert Goldwin, senior vice-president at Cullinane Corp., said his firm is now working with four government agencies to create a data base system using an IBM 370/158 in Kansas and a Digital Equipment Corp. PDP-11 in Georgia. Cullinane is using software implementation to solve the data base problem.

Running the application program for the system on the 370, Cullinane is storing the data base on the PDP-11, Goldwin said. Efforts to correlate data between the 370 and the PDP-11 created the biggest problem, he noted. The 370's packed-decimal format, representation of binary numbers and sorted sequences caused Cullinane to stop work on the project.

Data base research should be directed toward changing conventional ways of storing data, according to Stewart Schuster, manager of Data Base and Languages for Tandem Computers, Inc.

A complex data base language is necessary to allow CPUs to relate data to each other faster and more efficiently, Schuster said. A complex query system that allows on-line updates and a 10^{10} byte memory are necessary to make a data base computer work.

Availability also is an important aspect of data base management. "Uptime is extremely important," Schuster said, and the data base must be adequately protected.

Some problems remain to be worked out before a data base computer can become a reality, he said. Basic technology in both hardware and software has to be improved. Computer-aided design will help with that process.

"It's possible to build in 1980," but the cost of the system would be rather high at about 1 cent per bit/sec, Schuster said.

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A group gathers to stare down a printing performance.

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Work on Operating System Outlined

Development Method Review Held Useful

By Don Leavitt
CW Staff

NEW YORK — Sometimes you can learn something useful by reviewing a development methodology that worked in the past, even if it will never be used again, David J. Pearson told a National Computer Conference session on software performance.

Now manager of advanced systems development at Bell-Northern Research in Canada, the bearded, soft-spoken speaker made his point by outlining work done in the early 1970s on an operating system at International Computers Ltd. (ICL).

The Virtual Machine Environment/B (VME/B) operating system for ICL's 2900 series mainframe was to have all the desirable capabilities — high-level structures, ease of maintenance and enhancement, high reliability and a richness of features, he recalled.

To get the control, formalism and structure needed to get the VME/B up and running on schedule, ICL put together the Computer-Aided Development and Evaluation System (Cades). Certainly control was needed, Pearson added, noting that at one point ICL had between 250 and 270 programmers working on the operating system.

Cades had a formal design methodology encompassing structured modules and formalized top-down design with levels of abstraction carefully worked out. It was to be a data-driven system, the speaker said.

Cades also had a design definition language that in effect pushed everyone into formal and complete definitions of what was wanted in the system. Perhaps key to this part of the Cades approach, the definition language was developed in such a way that the definitions were directly "machinable."

The automatic code generation feature eliminated or at least reduced much of what Pearson described as the "finer trouble" error rate, involving problems caused by faulty transcription of otherwise good data.

The development team also had the foresight to create a product life cycle data base and a formal data capture and control mechanism. Those two parts of Cades were probably the secret of its moderately effective computer-aided design, Pearson said. They were comprehensive and unified in their approach.

But the data base and the formalization of the data capture mechanism also imposes rigid authorization cycles and reinforced the project management aspects of the system, he said.

The product life cycle data base had a number of specific applications, Pearson stressed. Quite apart from supporting the design automation, it encouraged a coherent analysis of the input intended for the system; led to a product information system or query facil-

(Continued on Page 34)

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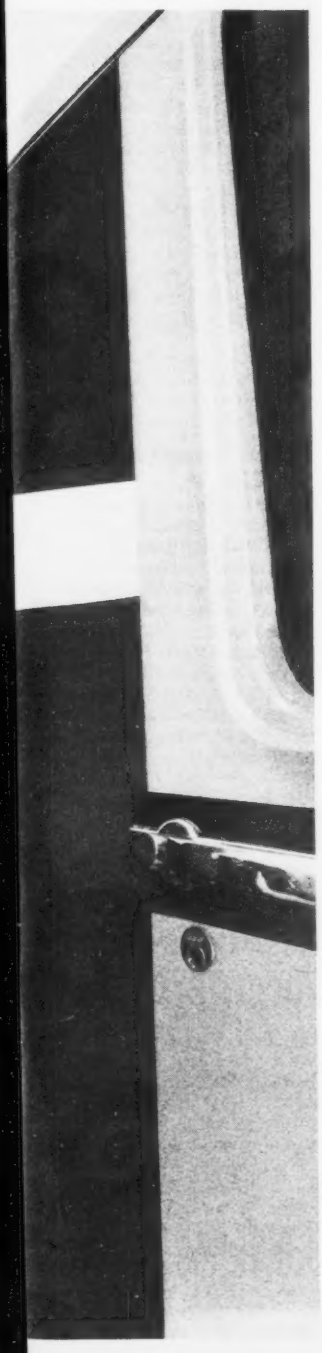
up and delivery.



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Users Briefed on Gauging Software Reliability

By Don Leavitt
CW Staff

NEW YORK — It is important to measure the reliability of a software system, but it is also important to recognize that higher and higher levels of reliability have a cost, according to John D. Musa of Bell Laboratories.

Addressing a National Computer Conference technical session on measurement of reliability, he noted that the increasing cost and operational impact of software failures has to be matched against the high cost and scheduling impact of testing that is unproductively long.

Reliability is not an absolute that applies equally in all situations, he emphasized. The best working definition of reliability — "the only meaningful one" — is that it is the probability of satisfactory operation of a system for a specified time and in a specified environment.

Satisfactory is the key word, Musa added: it implies an agreement between the users of the system and the developers that perfection is unlikely and that some point lower on the scale is a more practical target.

'Execution Time Theory'

To cope with reliability problems, Musa said he had been working for the past five years with what he calls the "execution time theory."

This theory recognizes that there are two components — execution time and calendar time — that are affected by the push for reliability.

Execution time is one of the best practical metrics. The more a system is run, the more it is exposed to failure-inducing stress. A relatively modest business application used every day is

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At NCC

more likely to fail than the scientific number-crunching system that's used once every six months, he contended.

On the other hand, the more a system is exercised, the more failures — or potential failures — can be corrected and the longer the mean time to failure should become, he said. But failure correction also takes execution time, he added.

The calendar time component in building reliable systems is keyed to the fact that at any given time, limited resources impact the amount of effort that can be put into a project. The limiting factors may be a shortage of test personnel or, even if the tests can be run, a shortage of effective debugging personnel, he said.

Recognizing these components, developers should also be able to see the systems engineering implications of the execution time theory, Musa contended. There is, for example, the balance of schedule and level of reliability required — or, if it is more important, the balance of cost and reliability.

Estimating Impact

Estimating the impact on schedule starts with a calculation of how long the nontest phases of the project — requirements definition, design, unit coding — will take. "Then you have to identify the expected number of failures and the initial mean time to failure, assuming that all goes well."

Those figures will generally be available from previous projects of comparable complexity, he said.

Then it's a matter of determining how many resource-limited periods the project faces ("the period used is up to the development team,"), computing the failures for each of those periods and then calculating the calendar time needed to correct those failures.

The cost/reliability tradeoffs are determined in much the same manner except that the cost — rather than the time — is taken into account.

Theory Validated

The execution time theory has been validated against 15 projects of various types and sizes, Musa said. Thus far, however, he would only categorize it as a good conceptual framework. It is, he said, a useful tool in systems engineering, project management and in estimating maintenance costs.

The side benefits, which may become even more significant, lie in the fact that the theory forces managers to ask such questions as "What is a failure?" "How is mean time to failure defined?" and "What will improved mean time to failure cost?"

Herbert Hecht, president of Sohar, Inc. and a panelist with Musa, commented that he liked the execution time theory because even managers could understand it.

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APL Congress Set for 1980

LEIDEN, The Netherlands — APL/80, the annual International APL Congress, will be held next year here under the auspices of The Netherlands Society for Informatics.

The Congress is scheduled for June 24-26, 1980, and will be organized by the Leiden University Computing Center. English is the Congress language, and a call for papers will be announced in the near future.

More information is available from APL/80 Organizing Committee, c/o CRI, Postbus 9512, 2300 RA Leiden, The Netherlands.

In Actual Dollar Terms

Concept Proposed to Find Value of Application

By Howard A. Karten
CW Staff

NEW YORK — Value determination (VD) may help DPers solve a chronic problem — that of determining the value of computer applications to an organization, National Computer Conference attendees were told here last week.

According to Edward O. Joslin, branch security chief for the U.S. Department of Agriculture and developer of the six-month-old concept, the benefits of the system are twofold. It pins down, in dollar terms, the actual dollar value of an application and can serve as a guide for installations or users considering implementing or upgrading an application. The basic value is determined by the requestor.

Describing his efforts to find a method over the past two decades, Joslin said "the only person who can or should say what an application is worth is the requestor and the person who will share in the benefits of the system."

Joslin described the method as one that weighs the losses that could be incurred if the application were not implemented against the cost of doing the application in its present fashion or the cost of alternative methods of doing it. In all cases, the discounted dollar sum over the life of the application must be considered, he contended.

Tunneling to the Core

Fundamental to this approach is the division of the application into a core and refinements. The core might, for example, be the heart of a telecommunications system; refinements would include such niceties or add-ons as real-time information retrieval systems. Using this approach, the value of a new application or an upgrade to an existing one can be determined, he stated.

Although the dollar value derived from such a study is important, the discipline this method imposes on management is even more important, Joslin claimed.

Noting that many installations have tried, and still try, to use cost/benefit statements, Joslin said this approach was "a cop-out. It's better than nothing, but not by much." Such cost/benefit statements suffer from vagueness, he contended.

Sharing the podium with Joslin was G. Kent Godwin, director of the Standards and Security Division of the Department of Agriculture's Office of Automated Data Systems in Washington.

CW At NCC

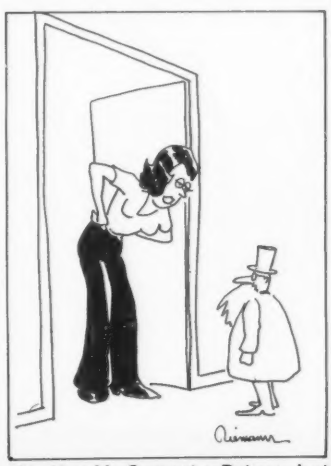
To illustrate how Joslin's concept could be applied practically, Godwin described the way in which the department recently began evaluating some possible upgrades to a payroll system the department has been using for a long time.

For example, employee checks were sometimes not distributed at the proper time. Although the mix-ups usually had simple explanations — a check might be deposited directly into an employee's bank account, for example — the result nevertheless was a considerable loss of productivity. This loss of productivity resulted from the time wasted initiating the inquiry and tracking down the problem. It also stemmed from the emotional upset caused to the employee; the department assumed that frustrated and anxious employees were unproductive for the remainder of the work day.

Other inadequacies and weaknesses in the system caused the department to contemplate several independent upgrades that would make provisions for listing cumulative amounts for salary, tax withheld, deductions, and so on — items familiar to most employees paid by computer.

By listing the estimated cost of ameliorating each situation against the loss caused by each one, the department was able to determine the course it should take.

However, Godwin did not indicate what the eventual outcome of this situation was or whether it actually saved the government any money.



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IBM 8100 Features Will Be Standards: Zatyko

By Jeffry Beeler
CW West Coast Bureau

NEW YORK — With last year's announcement of the 8100 system, IBM introduced several distributed processing features that are almost certain to become standards in the minicomputer field.

That opinion was expressed here last week by Zatyko Associates founder Dan Zatyko, one of the speakers at a National Computer Conference session about state-of-the-art minicomputer hardware, software and distributed processing techniques.

The other two speakers at the session were Pick Associates Chairman Richard Pick and Norman Schibuk, systems director at Multiple Funding, Inc. here.

In his address, Zatyko noted five 8100 features that are reportedly destined for adoption by mini makers outside the IBM sphere. These features include data presentation services that define screen formats for CRT terminals; a development management system that helps users find the retrieve applications from storage promptly; and a host command facility that permits the attachment of 3270-type terminals.

The other two 8100 features purportedly destined for standardization are the system's data base and transaction management facility and its distribution system executive.

Predicting that hardware will account for only about 25% of networking costs during the 1980s, Zatyko cited software as the key consideration in installing a decentralized system.

All suppliers of distributed processing software should have increased user involvement as their prime design objective, he said. Mini users have

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grown tired of having to delay applications because of the difficulty of acquiring highly skilled programming personnel.

Today, users want to place their applications on-line promptly and, to that end, have demanded software that will allow them to do much of their own coding, Zatyko noted. Thus, minicomputer software that does not permit coding by "para-programmers" can scarcely qualify as a state-of-the-art product.

Some of the software features enabling users to do much of their own programming include a forms language, several high-level languages like Cobol, a data base management system similar to the one announced with the IBM System/38 and a word processing capability, the founder of the Santa Ana, Calif., consulting firm said.

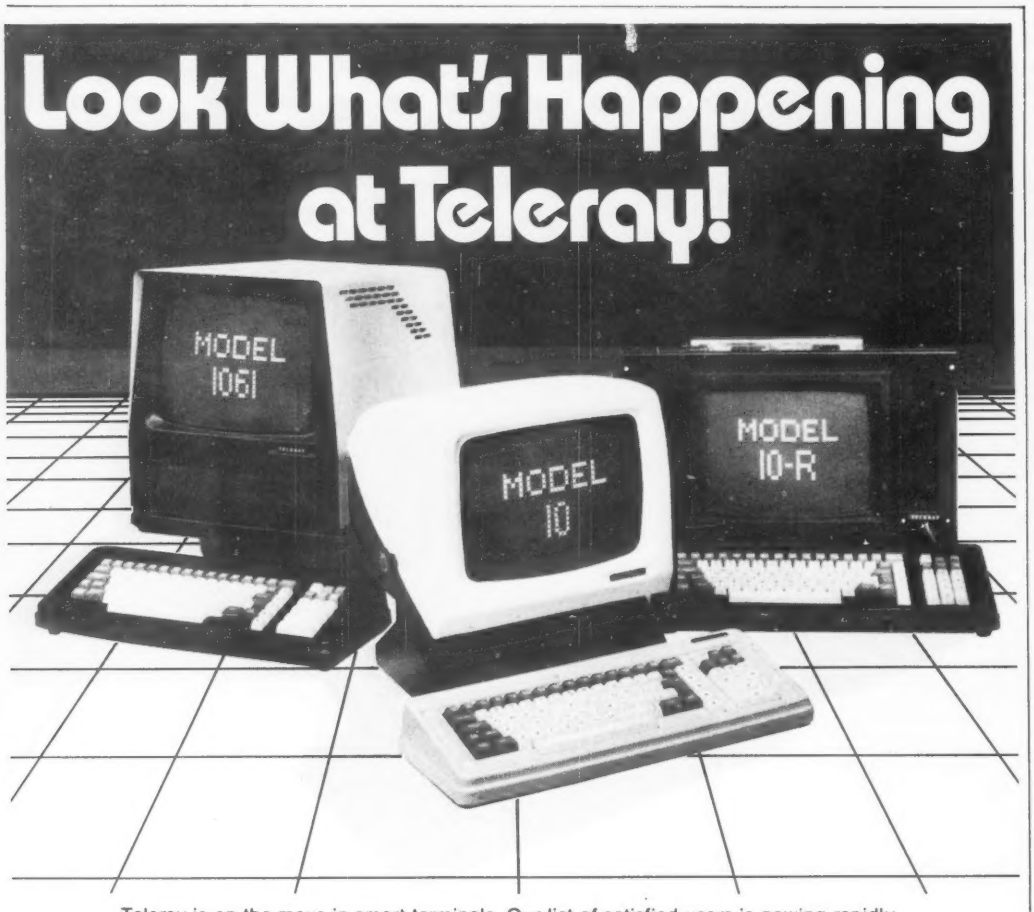
A truly state-of-the-art forms language, he added, accommodates not only data entry but editing and preprocessing as well, while the word processing software should incorporate a distributed computing capability. In this way, the word processing feature permits a mini's communications lines to carry both electronic mail and business transmissions.

Solutions, Not Opportunities

In other remarks during the session, Schibuk reiterated the need for mini vendors to view distributed systems as solutions to users' problems rather than as opportunities for overcoming interesting technical challenges.

Most users of decentralized systems care less about the details of a network's installation than about the results it yields. Some vendors, however, become so preoccupied with the technical problems of installing a distributed system that they recommend the approach for its own sake, not because it is in the user's best interest.

A concerned vendor "finds out what a user wants and then finds an engineering solution," said the representative of the insurance firm. A distributed system should be proposed as the solution only if a user's needs warrant it.



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Method Review Held Useful

(Continued from Page 31)

ity; and eased the construction and maintenance of the automatically generated code.

All of these applications were a big help, he commented, noting that VME/B had about 2,500 modules, and there seemed to be about 10 versions of each module at any one time. Control was clearly a necessity, not simply a nicety.

Cades had some extremely pragmatic results, Pearson continued. At a time when productivity studies in the U.S. were reporting anywhere from 10,000- to 1,500' instruction/man-year — depending largely on how much interaction was required — the ICL effort was "below the 1,500 figure."

By the mid '70s, however, using Cades, the development team was producing about 4,500 instruction/man-year — a threefold increase in productivity.

But Cades also combatted the tendency of systems to increase in disorder as they increase in size. It reduced the structural decay that often sets in and also kept down the ripple factor — the tendency of one change to require others to keep the system in balance.

Harris Poll Finds:
Most Americans Feel DP Threatens Privacy

By Marguerite Zientara
CW Staff

STEVENS POINT, Wis. — Fifty-four percent of the American public considers the present use of computers a threat to personal privacy. That figure represents a 17% increase since 1976.

The findings were gathered in a recent poll conducted for Sentry Insurance Co. by Louis Harris & Associates, Inc. and Dr. Alan F. Westin, professor of public law and government at Columbia University. The study also found that:

- Blacks are somewhat more concerned than whites about threats to their privacy.
- People who are politically middle-of-the-road are less concerned than liberals or conservatives.
- Those in the upper and lower income groups are less concerned than those in the middle income groups.
- People between the ages of 30 and 49 are more concerned than those in the younger and older groups.

In addition to the general public, Harris polled business and government executives, including 36 computer industry executives. A total of 2,131 personal interviews were conducted, each lasting approximately an hour.

Among the leadership groups, a majority of business employers (54%), state insurance commissioners (61%), congressional respondents (75%), regulatory officials (75%) and doctors (70%) feel that computers are a threat. "Most importantly," the study pointed out, "53% of those in the computer industry itself also believe that computers are a threat to personal privacy."

While the majority of the public interviewed believes computers have improved the quality of life and enable businesses to provide more individualized service, certain fears were clearly indicated. By an 80%-10% majority, the American public agrees that computers have made it easier for individuals to improperly obtain confidential personal information about others, the study found.

In addition, by a 52% to 27% majority, the public feels that the privacy of personal information in computers is not adequately safeguarded. "It is not surprising, then, that 63% of the public agrees with the statement that 'If privacy is to be preserved, the use of computers must be sharply restricted in the future,' " according to the study.

Leaders, however, are at odds with the public on that score, and majorities of every group except doctors disagree, the poll found. "The message is loud and clear. If the institutions of this society expect to be able to continue making widespread use of computers, the public must be convinced that the personal information stored in the computers is adequately protected from improper use."

Acceptable Uses

Questioning the respondents about specific uses to which computers might be put, the poll takers found Americans are not opposed to the use of computers in every situation. By 87% to 9%, the respondents believe it is justifiable to use computers to check welfare rolls against employment records to identify people claiming benefits to which they are not entitled.

By "a solid majority" of 68% to 23%, the public also believes it is acceptable for the Internal Revenue Service (IRS) to use computers to check tax returns against credit records.

Finally, a slight majority of 53% believes the insurance industry is justified in maintaining a central file containing information on anyone suspected of making a fraudulent claim on an insurance policy.

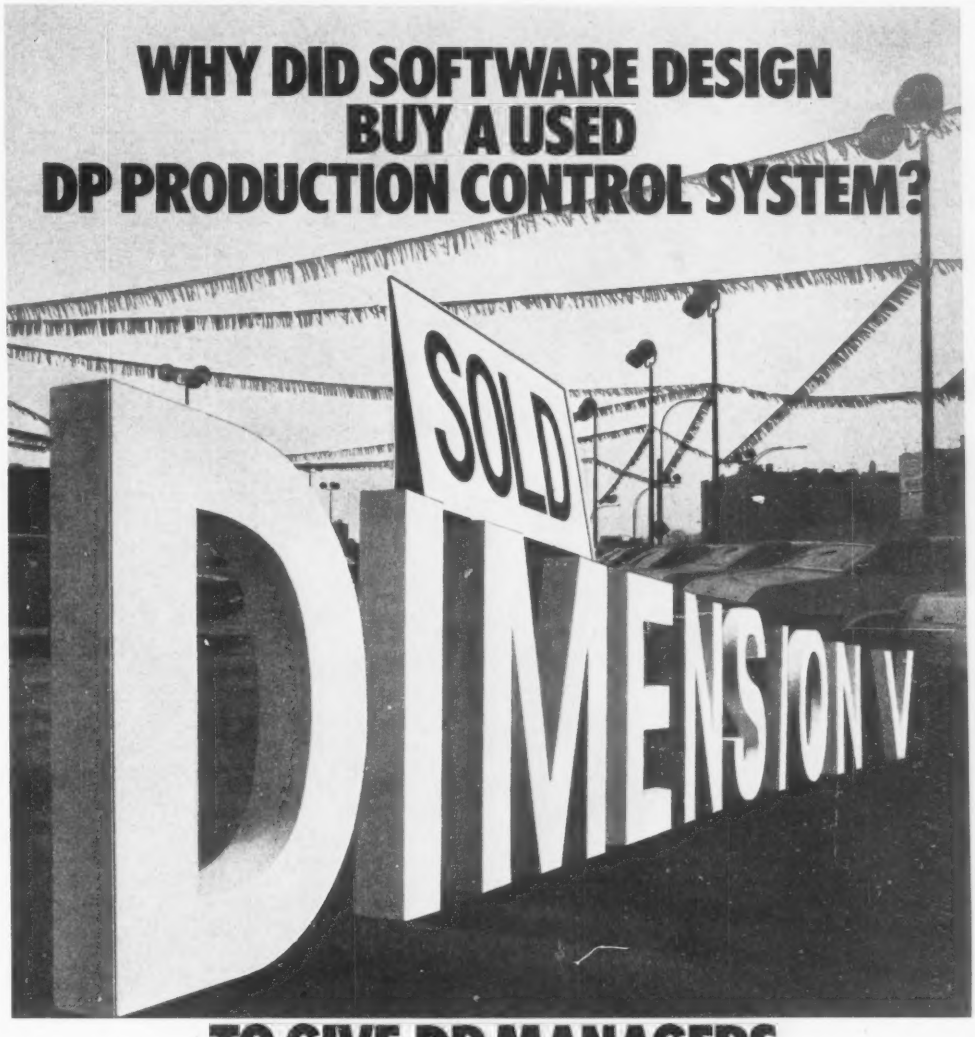
The majority of the public, however, does not feel it is justifiable to allow employers access to a central file containing the names of all individuals who have been treated for mental health problems.

In general, the leadership groups agree with the public on the questions pertaining to justifiable uses of computers, with one notable exception. Except for those in the insurance industry, a majority of all leadership groups feel it is not justifiable for the insurance industry to keep central files on persons suspected of making fraudulent claims.

While one in three Americans feels the U.S. is very close to the "Big Brother" society portrayed in George Orwell's book *1984* and 73% feel it is "somewhat close or closer," leadership groups are less likely to feel that way, with the exception of doctors, the study found. The greatest concern is shown by senior executives of credit companies. Twenty-five percent of those executives questioned feel the U.S. is in or close to such a society.

Furthermore, the public does not want to stand by and let the situation rectify itself. Sixty-seven percent of the public feels that new laws and organizational policies "could go a long way to help preserve our privacy," the study found.

Copies of the poll's results, entitled "The Dimensions of Privacy," are available free from the Director of Consumer Information, Sentry Insurance, 1800 N. Point Drive, Stevens Point, Wis. 54481.



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Ignorance to Blame?

Communication Problem Seen Permeating DP

By Howard A. Karten
CW Staff

BOSTON — A commonly held view of scientists, engineers and others engaged in highly technical work is that they do not communicate well with others.

Could this be true of people working in DP? Do programmers, analysts and others in the field face communications problems? Two people heavily involved in the human side of DP say they do. They are Dr. Gilbert Kaskey, director of human resources development with Univac, and Bob O'Hare, head of the management consulting company O'Hare and Company in Philadelphia and a 21-year veteran of DP.

"Technologically trained people typically do not communicate well," Kaskey said flatly. "A lot of criticism has been leveled at schools. It is said that people don't get the training [in communication skills], but I'm not sure that is the cause of the problem ... But there is no question that there is a problem."

Blissful Ignorance

Kaskey's view is seconded by O'Hare, who added that DPers — programmers and analysts, particularly — are quite adept at what they do, but fail to focus on the business problems they are trying to solve. "One of the main problems in this area is that the DPer doesn't attempt to — or know how to — really communicate with users and understand the problems and how they should be solved. There is a tendency to want to just go off by themselves.

"This attitude results more from ignorance than lack of intelligence; computer people are pretty smart people, but because they don't communicate with the marketplace, the wrong problems get solved," O'Hare added.

The communication problem does not necessarily pervade the computer industry as a whole, Kaskey said, but it "is certainly true of any technical industry."

To illustrate his point, Kaskey cited the difference between communicating with DP marketing personnel and DP technical personnel. "Marketing people are better communicators almost by definition. The marketing individual is the kind of person who likes to communicate and who makes his living at it." Although "the research-oriented individual has to communicate at some level, a large part of his time and efforts are devoted to internal thought and developmental kinds of activities."

Less Difficult Levels

"In fairness, the level and the detail and the logic involved in [communication by marketing types] is not as difficult. It's one thing to describe the logic and operation of a system, and quite another to talk to a customer about the ability to solve a problem," he continued. How someone communicates is "absolutely a joint function of the personality of the individual and the kind of work he does."

The communication problem surfaces in several areas, both men indicated. In addition to the problem of designing the correct program, there are problems in the area of supervision and in the activity that precedes all others in DP — making a sale.

"Typically [in Univac's experience] there are systems analysts involved in pre-sale work with a customer who then take that communication down to the next level [that is, a more technical one], and the pre-sales systems analyst is usually a better communicator than the post-sales analyst."

Selling to Operations

"It's the top man of an organization who is going to make the decision ultimately, but before a sale is made at that level it usually has to be made to the customer's operations people, who must be convinced your product is as good as or better than the competition's. I'm not sure the communication is strictly technical at any of those levels," Kaskey said.

"You can talk in terms of bits and bytes, but the fact is that the customer wants a solution to a problem and not some raw, statistical or scientific information. So, while we can probably communicate scientific information very well, we can't always communicate in the sense that the recipient understands exactly what it is we are saying," he said.

Supervision a Problem

In terms of supervision, too, there is a problem. "When you are a manager, you have to find ways to let your subordinates find satisfaction in their work. Among the things you have to do as a supervisor are evaluate your subordinates' performances and discuss with them the problems they are having, the directions in which they are going, how they're making out with the tasks themselves and how they're reaching their goals.

"In order for a person to really supervise or manage well, they have to develop a rapport with the subordinate, which takes an awful lot of listening and asking the right questions," O'Hare commented.

The Amdahl Newsletter Volume 1 Number 3

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Taken from the 1978 annual report.

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ICCP Schedule Mix-Up Causes Some to Miss Exam

By Jeffry Beeler
CW West Coast Bureau

LONG BEACH, Calif. — Because of an apparent mix-up in scheduling, at least one DPer and possibly several others arrived here on May 19 to take a certifying exam, only to discover the test had been given two weeks earlier.

One of the latecomers, who asked not to be identified, blamed the snafu on the test sponsor's failure to retract an announcement that had originally set the exam for May 19 instead of May 5, the correct date.

The faulty scheduling information is said to have been disseminated in a letter the Institute for the Certification of Computer Professionals (ICCP) mailed last summer to applicants for the Certificate in Data Processing (CDP) qualifying exam.

The CDP candidate admitted having received several other ICCP documents, including a study guide and three test admission cards, during the months following the letter's arrival. All these documents correctly listed May 5 as the exam date, but because none explicitly directed her attention to the erroneous first announcement, she never noticed the discrepancy and continued to believe the exam would take place on May 19.

Although the DPer later accepted some of the blame for her failure to show up on the correct date, she faulted the ICCP for not sending a letter formally retracting its original test date announcement. "I'm aghast at the casualness with which they seem to treat these test schedules," she complained.

In New York City, a spokesman for the Psychological Corp., which administers the ICCP's exams, admitted having received complaints from "five, maybe 10" CDP applicants who claimed to have missed the May 5 test because of the ICCP's conflicting announcements. However, the vast majority of the applicants were not misled by the date change and arrived at the exam site on time, according to Ann Fitzgibbon, Psychological's test coordinator.

Of this year's 3,400 CDP candidates, an estimated 3,200 took the exam as scheduled, she added.

In Chicago, meanwhile, ICCP Assistant Secretary Jamie Fox traced the test date controversy to a letter the institute sent last summer to all applicants who failed all or part of the CDP exam in May 1978. The disgruntled DPer was among the applicants who received a copy of the letter, which informed her she had passed two sections of the five-part test.

Somewhere in the body of that document, the ICCP incorrectly listed May 19, 1979, as the date for the next CDP exam, Fox admitted. In a second letter mailed about a month later, the ICCP revised the test date to May 5, although it never specifically instructed recipients to ignore the earlier May 19 reference.

Asked whether the institute should have been more explicit in retracting its first test date, Fox waffled. "I don't know," she replied. "Perhaps so."

At any rate, the ICCP again mentioned the May 5 test date in its study guides, which were mailed to all CDP candidates shortly after the first of the year. The final reference to the May 5 test came about two and a half months later, in early April, when the institute distributed its admission cards, small slips of paper that entitled their holders to take designated sections of the exam.

Money, Time Down the Drain

But for a few applicants, the ICCP's reminders went unheeded, and the resulting confusion cost them dearly.

Another late arrival, for example, forfeited more than 20% of her CDP exam admission fee, which included a $10 testing charge and three $12 fees, one for each test section she was scheduled to take. The ICCP has agreed to repay her $36 section fees, but the $10 testing charge is nonrefundable.

The ICCP typically offers the CDP test only once each year, and the next one isn't scheduled to be administered until May 1980.

Another disappointed applicant, however, expressed the hope that the ICCP would amend its policy this year and schedule a makeup exam to compensate those who missed the first test.

Thus far, the ICCP has declined to respond formally to that proposal. But Fitzgibbon voiced sympathy for the latecomers' plight. "I see their point and understand their problem."

Hunt Nabbed in Honolulu

HONOLULU, Hawaii — Norman Henry Hunt, suspected of operating a bogus microcomputer company called World Power Systems, Inc. through which he allegedly swindled computer users, retailers and hobby magazines, was apprehended here last week.

Although details are still sketchy, Hunt was reportedly captured by Federal Bureau of Investigation agents on May 30 and is expected to be extradited either to Arizona to face trial on fraud charges or to California, where he had escaped from Chino State Prison earlier this year after being convicted of a similar swindle.

Hunt, who has used numerous aliases in his career, had been hunted by state and federal officials since April 27, when he fled the Tucson area after realizing his alleged rip-off scheme was about to be exposed [CW, May 14].

Under the aegis of World Power Systems, Hunt reportedly advertised fictitious computer equipment in most of the major computer hobby magazines and collected money from customers, as well as equipment parts on credit from other businesses, with the intention of later reselling the equipment.

Several hundred thousand dollars of computer equipment which Hunt was allegedly forced to leave behind in his flight from authorities was later discovered by police.

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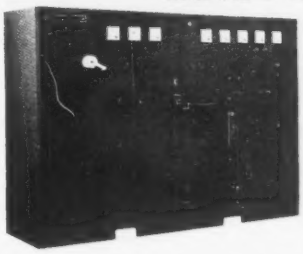

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District Court Gears Up For Speedy Trial Act

By Tom Henkel
CW Staff

BOSTON — To help comply with the Speedy Trial Act, the U.S. district court here is installing a Digital Equipment Corp. DEC-10 VT61 to speed up trial assignments and keep court records.

The federally mandated Speedy Trial Act, which will be fully implemented in July, requires dismissal of cases if the defendant is not brought to trial within 60 days.

According to David Kopech of the district clerks of courts office, the DEC-10 will be installed in about two weeks. The system will monitor the case load of each of the 10 district judges, Kopech said, and case assignments will be made according to which judge has the most available time.

With the current noncomputerized system, cases are often distributed in a lopsided fashion with some judges being swamped, while others have relatively few.

However, the major benefit from the system will be in locating 250 to 300 defendants each month, Kopech said. Finding defendants and having them appear at the right time for trial is one of the major problems facing the Boston office.

Similar computerized systems have been used in 10 other district courts with "tremendous success," he said.

Currently the Boston District Court is processing about half its cases within the 60-day period.

The Speedy Trial Act, which was passed by Congress in 1974, has come under fire by trial attorneys who say the 60-day time limit is unrealistic and will result in more acquittals by default. The lawyers also say the Speedy Trial Act will cause higher fees for more poorly prepared cases.

Kopech said the system won't do much to alleviate attorneys' problems. Some minor gains may come as a result of more accurate scheduling, but the problems of preparing cases within 60 days may still present a problem.

Melvin Norris, vice-president of the Federal Bar Association, said the computer will help in trying civil cases. "When all the issues are joined, the computer is automatically going to pump out that information. I also think it will be easier to get an update on the status of your case."

However, Norris was skeptical that the court's CPU will speed up the judicial process. "I'm not sure how that can work. For example, in a criminal case, we are not entitled to a list of the government witnesses automatically. Surely it's going to help keep control of where the defendants are, but the lawyers have to know where the defendants are also.

"The big problem we see is in the civil cases. You can't get a civil trial promptly because the criminal cases come first. So, if they can smooth out the time frames for the judges and move some of the cases around, that's going to be a big help to lawyers."

Norris said more trial lawyers may turn to using their own computers to speed up preparation for trial. Lawyers are making greater use of the Lexis and West Publishing Co. systems to aid in legal research. Norris said the two systems offer a cross-reference of cases to aid in preparing legal briefs.

"Certainly computers are the only way a small law firm is going to be able to survive.

"The legal profession needs computers. We need a computer in our office right now for our billing and time, but we just haven't been able to get one in the price area we want. If we could tie into a system that was reasonable in cost to do our billing, it would be a tremendous help. We could cut one person off our staff," he said.

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Terminal Net Links Users

Data Base Lets Airlines Buy Parts as Needed

By Jay Woodruff
CW Staff

MAHWAH, N.J. — Airlines faced with the increased costs of doing business now appear to have a way to eliminate the high expense of maintaining large parts inventories for plane repairs.

National Airlines, Capitol International Airways, Braniff International, Delta Airlines and 16 others will access the $60 million parts inventory of Ramco International, Inc. and other available inventories.

A communications system set up by Ramco offers the airlines seven real-time programs to buy parts as needed instead of having to stock the parts themselves. The main advantage for the airlines is the system's cost — approximately 35% to 40% cheaper for parts than the manufacturer would charge and 35% cheaper for the communications usually involved in the process, according to Ramco President Don Rvocco.

Ready Data Offered

The company was founded five years ago on the premise that an on-line system did not exist that offered ready data on spare supplies and demand trends, Rvocco. "My idea was to computerize this data and make it available on a real-time basis," he explained.

Prior to hooking up to a computerized data base, airlines had access to other parts suppliers, but Ramco is the only supplier which has computerized information on the subject, according to John Stephens, a member of Capitol International Airways' purchasing operation.

With such a large number of parts making up each DC8 in Capitol's fleet, parts researchers often found it difficult to locate the specific part order number when repairs were needed.

"The researchers don't have time to study up on every part in the planes. Now, even parts whose numbers have been changed can be brought to our attention.

"In the past, we had to check for parts on microfiche, with information that was updated every month. Then we had to make long-distance phone calls, which would tie up our communications," Rvocco said.

"But now we bring Ramco into the picture quickly, along with other information which it handles over its lines," he noted.

Lead times range from same-day turnaround of on-line orders for regular maintenance to same-day delivery of needed parts for emergency repairs.

Computer-Assisted Sales

The system is used in a step-by-step process. An airline purchasing agent enters the number of the needed part on an IBM 3276 CRT, which is connected by dedicated lines to Ramco's IBM System/3 15D with 512K bytes of memory. The CPU handles all switching between terminals.

The system accesses its disk files, which can hold five million records with up to 150 characters each. If the item is available, the system automatically quotes a price within four seconds of the inquiry. The user can then decide whether to buy.

If an order is placed, the system confirms it on-line and sends an air bill.

If the item is not in stock, the user is notified and the system checks all the information in the data base, including the Airline Transportation Association's Excess Materials Listing and the inventories of airlines which list overstocked parts. About 80% of the inquiries, however, can be processed from Ramco's inventory, according to Vince McNally, the technical expert responsible for implementing the Ramco system.

The user can directly connect itself to another airline participating in the network and order a part directly from it if one is available, McNally said.

To date, five terminals have been installed, the first going to Capitol International Airways. All the other airlines that have signed up for the service will have their terminals installed in two weeks, or "as soon as I can fly around and get them installed," he remarked.

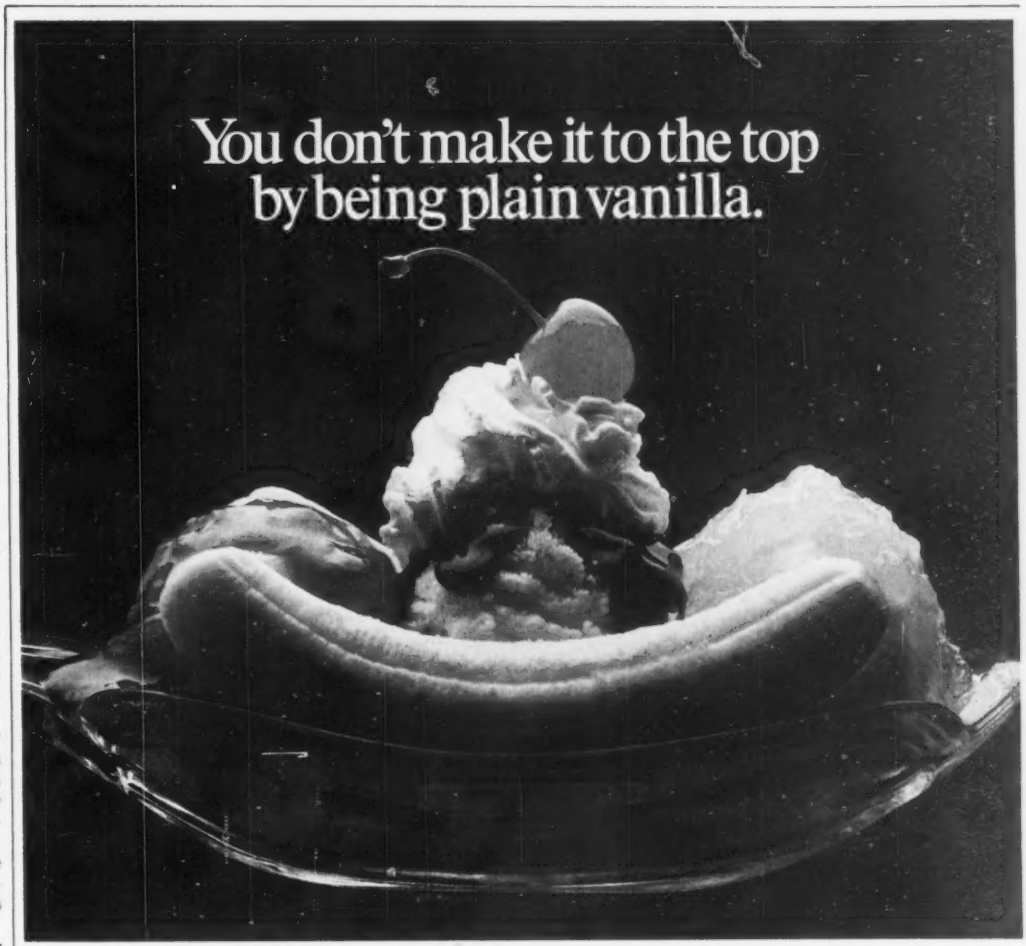
The terminals are connected by a dedicated line that Ramco ran from Vancouver, Canada, down the West Coast, across the country to Miami and up to New York, with drop lines to the individual terminals.

At Ramco headquarters here in Mahwah, 20 IBM 3276 CRTs are installed in the company's various departments and nearly all communications is handled without paper. "We call up the information, and there it is. If we want it, we print it," Rvocco said.

The company has abandoned report techniques and does "virtually zero batch work." The system itself processes 400,000 transactions a month, the Ramco president noted.

As the system now stands, inventory control is accurate within 1% "both in count and in dollars' worth of error," Rvocco claimed.

Ramco has been refining its applications programs for materials management. In the process of getting the airlines connected to the system, the company found that "much to our surprise, our applications were far in advance of what many of the world's airlines were using."



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Hardware Outlook 'Superb,' Hammer Declares

By John Whitmarsh
CW Staff

BOSTON — The steady march of computer technology will continue at an "unabated pace" through the end of this century, according to a respected industry prognosticator.

Drawing on more than 40 years of engineering and computer experience, Dr. Carl Hammer, director of computer science at Univac, declared here recently, "We are only at the beginning of the technological curve.

"The outlook for hardware is superb," he said, peeking into the future. "Major changes with large impacts are still in the offing, and some of the things today will be historic in 10 years."

Among the hardware developments Hammer foresees occurring by the year 2000 or before are:

- The development of microprocessor chips of 10G or 100G bits in today's sizes and at today's prices, as a result of economies of scale.
- The replacement of CRTs by flat screens in the 1980s and voice recognition in the 1990s.
- The development of language translation or print-to-print capability by the 1990s.

Hammer warned his audience that technological advancements will also usher in new problems, chiefly the displacement or retraining of office workers as computers assume a larger share of the clerical workload.

The outlook for applications is "excellent," Hammer said, with the brightest possibilities in office work and pattern recognition.

"The last labor-intensive frontier is office work," Hammer said. Currently 10 million persons are employed in clerical jobs, and that huge pool of labor offers vast possibilities for computers. "We have replaced the intensity of human labor with machines in other fields, and it will happen in office work as well," Hammer predicted.

The advances in office work will come in the storage of correspondence and in the reduced cost of writing and sending a business letter, which is currently pegged at $7 to $10.

Productivity gains in the office will be achieved because the computer is millions of times less expensive than human clerical help, Hammer said, explaining that one second of mainframe computer time equals more than $1 million in clerical salaries.

The chief problem of computerization is the displacement of human labor, Hammer said. Such displacement happened on a relatively small scale when pocket calculators replaced slide rules and when electronic watches replaced mechanical ones. In both those cases, however, displaced employees were retrained and absorbed into the labor force.

The field undergoing the most intensive research at the moment is pattern recognition, according to Hammer. "Pattern recognition, sometimes called artificial intelligence, is being done in one, two and three dimensions," he said. But, as in the analysis of traffic patterns or national economic patterns, "pattern recognition only deals with isolated patterns, with one part of the economy or at one traffic intersection. We do not yet have enough computer power to see the big picture."

Software Outlook Poor

While the outlook for hardware is superb and the outlook for its application is excellent, the outlook for software is poor, Hammer said.

"Software productivity gains over the past 30 years have been only on the order of a factor of two, compared with vast hardware gains," Hammer said. "I see no relief from software bottlenecks in the next 30 years."

Hammer cited two reasons for his prediction. First, the proliferation of legislation and regulations keeps business and society in a constant state of flux. The announcement by the Internal Revenue Service of new reporting requirements [CW, May 28] is one example of legislation that will have far-reaching effects on software and programmers, Hammer said.

The second reason he anticipates trouble for software is the inherent complexity of the software itself.

"We must begin to fragment the software into small, certifiable portions," Hammer said. He predicted that by the year 2000, software will be an assembly of macro components.

"Software as we know it today will not exist after the year 2000," Hammer concluded.

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Three Computer-Related Fields

High School Pupils Get the Business, DP, Too

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Reflecting the rapid growth of commercial DP, a vocational high school here has developed a curriculum in which information processing courses go hand in hand with classes in more traditional business disciplines.

Since its formation two years ago, the School for Business and Commerce (SBC) has offered 10 courses of study, including an information processing section, specializing in three computer related subject areas: programming, data entry and word processing.

Together, the SBC's information processing classes form one facet of a curriculum that also covers such standard business school fare as accounting, merchandising, banking/finance, advertising and advanced secretarial courses.

Most of the 100 or so students currently enrolled in the school's information processing program divide their classroom time equally between the SBC and their own high schools, according to Bryce Martens, information processing coordinator. All the enrollees range in age from 16 to 18 and are either juniors or seniors in high schools elsewhere in this city's unified school district.

To qualify for admission to the SBC, each student must have completed at least one DP course, usually in Basic programming, at his home high school.

Hands-On Experience

Once enrolled in the school, students supplement their classroom activities by receiving hands-on experience with the SBC's in-house hardware. In the programming class, for example, they interact with a 96K-word Digital Equipment Corp. PDP-11/34 running under Version 6-C of the RSTS/E operating system.

Other hardware modules in the system configuration include two 14M-byte DEC RKO-6 disk units, 13 Lear Siegler, Inc. ADM-1A CRT terminals, seven TTY 4320 printer terminals, one ASR 33 teletypewriter and four Texas Instruments, Inc. TI2745 portable data terminals.

In the data entry class, meanwhile, students use all-IBM equipment, including nine Model 029 keypunch machines, one Model 129 keypunch/-verifier, seven 3277 data entry terminals and one 3271 controller.

Business Computing

The bulk of the SBC's DP program stresses business computing as opposed to the more theoretical realm of computer science, Martens explained. The programming course, for example, specializes in Cobol and covers the fundamentals of programming, transaction processing, program maintenance and systems analysis.

Students who complete the information processing program receive no diplomas, but they do earn full academic credit that they can apply toward graduation at their own high schools.

Few of the business DP students take classes in the SBC's other nine departments, although some of the word processing enrollees stray into courses in allied disciplines like advanced secretarial skills, Martens said.

When they complete the information processing program, SBC students are theoretically qualified to enter the business DP field as programmer trainees or junior programmers. Most students, however, leave the school to enter local colleges, where they often major in computer science or related fields.

"The problem I've found is that most businesses are fairly resistant to hire someone straight out of high school without a college background," Martens said.

The SBC's training does, however, allow graduating students to skip many of the elementary DP classes in their chosen colleges and proceed directly to the more advanced levels of a computer science curriculum, he added.

Monthly Aids Idea Exchanges

WILLOW GROVE, Pa. — "Impact: Information Technology," a publication aimed at linking representatives of information management disciplines in order to exchange ideas, has started its second year of publication.

The monthly newsletter is published by the Administrative Management Society here and reports technological advances that are drawing various administrative functions of the office into a single, smoothly operating complex, according to a spokeswoman for the society.

A panel of 11 conributing editors cover such areas as DP, financial management, records management, telecommunications and word processing. Recent articles have treated the increased importance of the office of the future given practical advice on contract negotiations.

A sample copy of "Impact" can be obtained by contacting Estelle Jacobs at the society, Maryland Road, Willow Grove Pa. 19090.

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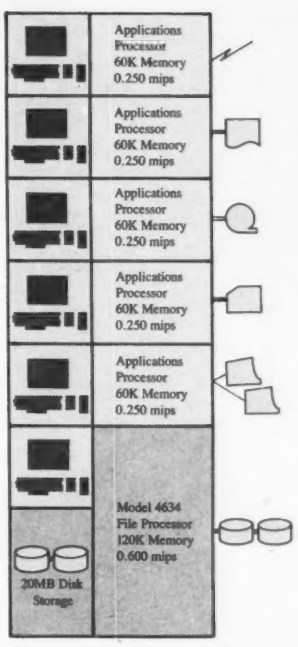

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Firm's 3033s Put to Work Heating Building

By Tom Henkel
CW Staff

NEPTUNE, N.J. — It may not exactly be one of the bigger selling points, but large CPUs give off a lot of heat. But enough to heat a three-story office building? If you ask 850 employees at Insco Systems, a subsidiary of Contenental Corp., the answer is yes.

During the natural gas shortage three winters ago, someone came up with the idea of opening the doors of the room containing two IBM 3033 CPUs, two printers and 160 disk and tape units. The company's main boilers were then shut down and guess what? Temperatures in the building dropped only three degrees.

Pleased with what had happened, the company decided to hire a local engineering and architectural firm to come up with some way to make better use of the 1.5 million BTUs per hour given off by the computers, senior vice-president William Barron said. The engineering firm, named CHU2A, designed a system of pipes and coils to heat air and water in the original 102,000-sq-ft building, along with a 72,000 sq-ft addition.

The system cost $90,000, but Barron said it was worth it. Last winter, the company didn't have to use its gas-fired boilers at all. Some gas was still needed to heat water, but the company's overall gas bill was cut from $40,000 to $15,000.

The company also avoided putting new boilers in the new addition, for another $125,000 savings in installation fees plus an estimated $30,000 annual savings in gas.

Barron said the heating system will have paid for itself by the end of this year.

Barron added he has already had calls from Italy, Belgium and Ford Motor Co. about the system.

There does seem to be one little problem, however: last winter there was too much heat. Office temperatures averaged around 78 to 82 degrees.

Vendors' Help Lets User Rebound Fast After Fire

By Jay Woodruff
CW Staff

STRATFORD, Conn. — When a fire shut down a service bureau here, its vendors supplied quick relief by getting the billing operation on its feet within a week.

According to Stratford Systems, Inc. president Frederic R. Swiers, vandals broke into the company headquarters on Saturday night, April 27, and set fire to the inside of the building.

The blaze destroyed the keypunch room and its IBM keypunch equipment, while in the next room, heat ruined a Datapoint Corp. 2200 business processor, a card reader, a printer and telephone company equipment. Damage was estimated to be "at least $100,000," Swiers said.

Duplicate records located in another building saved the business from losing data, he pointed out.

Swiers notified Datapoint of the disaster that weekend and when he called again the following Monday, he learned that replacement equipment was on the way. A more powerful system and a card reader had been located in New York City that would work in place of the 2200. They were installed two days later.

Before the equipment arrived, representatives of AT&T'S Long Lines Communications Division Crisis Control Center had expedited the installation of new lines and 4,800 bit/sec modems in a temporary office a block away from the wrecked computer facility.

On Thursday, Datapoint delivered a printer, while IBM flew in keypunch equipment from Toronto. "By the end of the week, we were in full operation," Swiers stated.

"I thought Datapoint was fantastic and IBM was just as good." Swiers also praised AT&Ts Paul Lewis as being "a very competent guy."

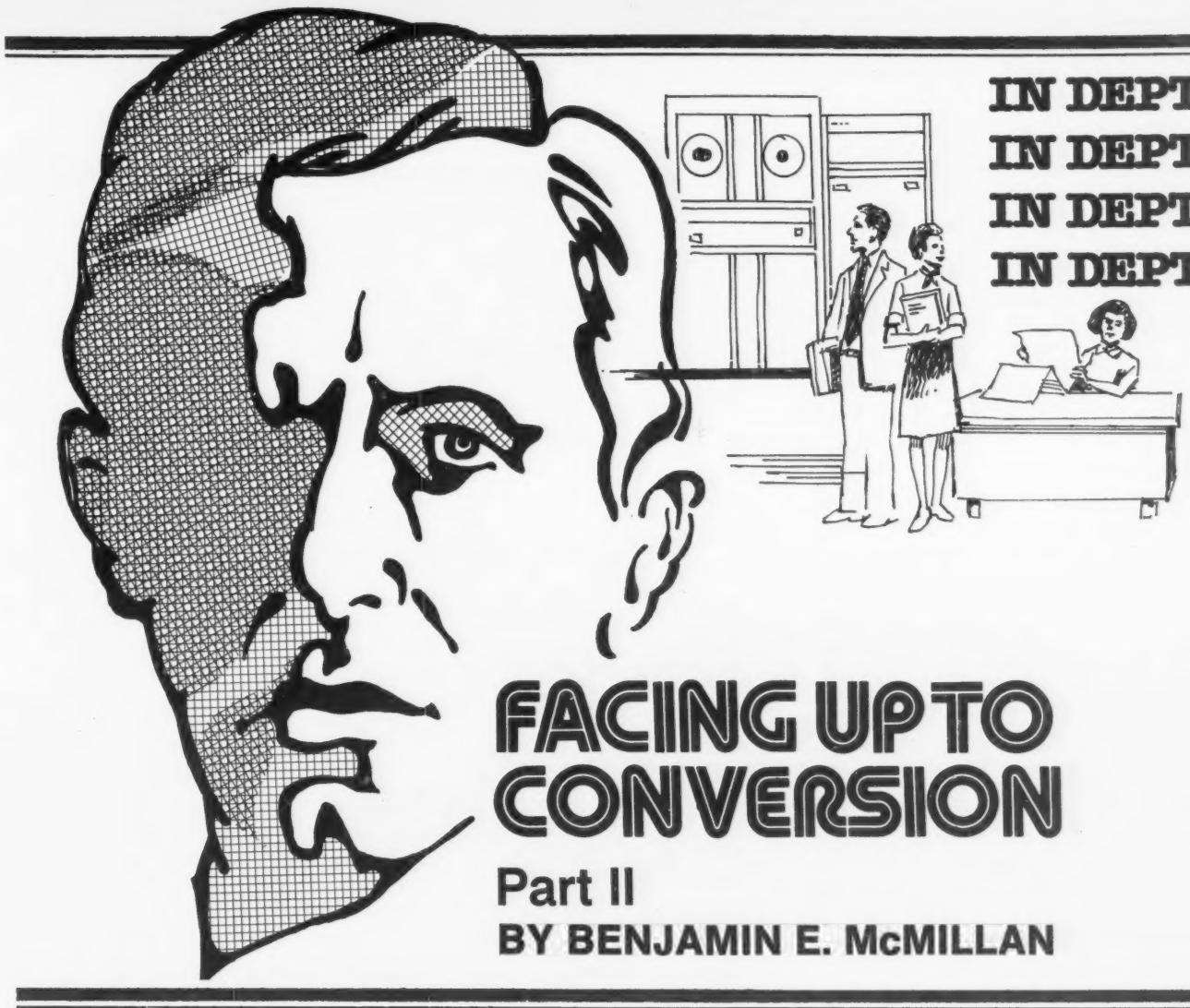
Visually Impaired Set Annual Meeting

GRAND RAPIDS, Mich. — The annual convention of Visually Impaired Data Processors International, to be held here July 1-3, will feature a presentation by Daniel McCracken, author and the president of the Association for Computing Machinery.

The convention will focus on technological advances that have facilitated the employment and upward mobility of the visually impaired in the field of DP.

Registration fee for the Vidpi convention will be $12.

Early registration is encouraged. Checks payable to Vidpi may be sent to R. Dean Wilbur, treasurer, Medcomp Research Foundation, 2400 Reading Road, Cincinnati, Ohio 45202.



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FACING UP TO CONVERSION

Part II

BY BENJAMIN E. McMILLAN

In Part 2 of this four-part series on conversion, McMillan discusses his survey of managers who had recently taken their installations through the process. He sought their opinions on what effects detailed guidelines had, or would have had, in their particular cases.

Computer-based information systems have been a part of the business scene for more than 20 years. In that time, the attitudes of managers who supervise and operate them have not remained static. This continual change has been the result of emerging new managerial styles and good and bad experiences of managers applying new technology.

Findings described in Part 2 of this series are based on a survey of information systems managers, both business and scientific, conducted between April 15 and May 15, 1973.

Questionnaires were mailed by name and title to 150 managers and supervisors and 61 replies were received. Eleven of these were omitted from the results for lack of information.

All the installations surveyed had computers valued in excess of $3 million and a job stream average of more than 600 jobs per week. The installations in the survey included military installations, educational institutions, aerospace firms, research institutions and many others.

More than half (60%) of the respondents used their computer systems for scientific computations; 38% used their systems for both business and scientific purposes; and 2% (one) used its system for business only.

Of the respondents, 14% had been directly involved with a computer conversion within the previous six months; 30% had been involved between six months and two years earlier; 22% had been involved two to four years earlier; 24% had converted with four to six years and the remaining 10% more than six years earlier.

It was apparent that the respondents had recent experience so the process of conversion would be fresh in their minds. This fact is important in determining the relevance of their opinions and attitudes toward the approach to conversion. Even though the managers of these installations had different styles, it appears as if they were in agreement in many areas on the subject of conversion.

Hypotheses Established

A set of hypotheses was established to determine if it was feasible to develop a set of general guidelines for conversion and what the attitudes would be toward using these guidelines. The questionnaire was designed to establish criteria for acceptance or rejection of the hypotheses (see Page 44).

The hypotheses were tested using a normal chi-square calculation. They were used to determine if there was a significant difference between those managers with a special staff and those without a special staff. The level of significance was .05 with two degrees of freedom. Each question had five possible answers, but because the extremes were very small, the tables for computational purposes were collapsed.

Because the research had to be conducted primarily using historical data and management experience, the following hypotheses were established, even though they appeared somewhat presumptuous at the time:

- Null hypothesis: There will be no significant differences between the number of difficulties encountered during conversion by installations with detailed guidelines for system conversion and those installations without detailed guidelines.
- Alternate hypothesis: There will be a significant difference in the number of difficulties encountered during conversions by installations with guidelines and those without.

1. The time and cost involved in selecting and installing a complex computer system will be decreased significantly.
2. The responsibility of persons directly involved with the conversion process can be more clearly defined.
3. The number of unforeseen events will be decreased significantly.
4. Personnel directly affected by the conversion process will be more cooperative.
5. The control of people problems will be significantly better.
6. There will be a significant difference in the quality of communications.
7. The support of top and middle management could be gained to a greater degree with detailed guidelines than without guidelines.
8. The transition during systems conversion will be significantly smoother.
9. The relationships of people directly involved with the system change can be controlled significantly better with detailed guidelines than with day-to-day management.

Because the questionnaire was designed primarily with closed-end questions, it is difficult to ascertain whether the installations with guidelines had fewer problems than those without. Of those that replied, 78% said the guidelines or procedures they used for conversion were adequate, while 18% felt they were not.

The null hypothesis was not adequately tested by the questionnaire.

The remainder of the hypotheses were associated with the questionnaire and chi-square statistics as shown in Figure A (on Page 45).

While trying to test the hypotheses using the results obtained with the questionnaire, a chi-square statistic was used to determine the significance of the answers.

It was found that at a .05 level of significance for four degrees of freedom, all answers were significant. The chi-

(Continued on Page 44)

QUESTIONS	NUMBER OF RESPONSES				
	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
1. Do you feel that procedures or guidelines for selecting your computer systems were adequate?	18	21	2	6	3
2. After the computer system selection, would detailed guidelines have helped the system conversion go more smoothly?	21	17	8	2	2
3. Detailed guidelines concerning information dissemination would have provided better channels for communications with those affected by the change.	20	21	8	1	0
4. In your opinion, would detailed guidelines for system conversion tend to cause more cohesiveness among workers directly affected by the change?	19	16	8	6	0
5. Do you feel that middle management support was given throughout the conversion effort?	11	25	2	9	2
6. Could middle management support be gained with guidelines for the conversion process?	6	25	11	6	0
7. Could top management support be gained with guidelines for the conversion process?	6	18	15	9	1
8. Responsibilities during the conversion period can sometimes be better assigned with set guidelines.	16	24	5	3	1
9. In your opinion, the amount of time between computer system selection and conversion completion would have been significantly shorter if a set of detailed gudielines or procedures had been followed.	13	16	10	9	0
10. The cost of a computer system conversion effort could be decreased significantly with detailed planning.	16	24	6	3	0
11. Do you feel that guidelines for people management during computer system conversion could realign responsibilities such that people problems may be kept to a minimum?	7	28	11	2	0
12. If there were a set of flexible detailed guidelines that covered computer system conversion from the point of approval of the system to the running of production on the new system, they would be used.	10	26	8	5	0
13. Do you think that it is possible to establish a complete set of procedures or guidelines that could be used for all phases of conversion?	3	20	4	18	5
14. In your opinion, would it be good policy to establish strict schedules for the computer vendors within your guidelines for computer selection?	18	19	5	2	0
15. If there is a large group of people directly involved with the computer, do you feel that their relationships may be controlled better by day to day management than by guidelines for conversion?	5	11	10	18	4
16. Can more effective management decisions relating to the organization be implemented with detailed guidelines for system conversion?	9	28	8	4	0
17. Do you feel that lost work time due to unforeseen events during the conversion period can be reduced with detailed outlines?	11	25	7	6	1
18. Is it possible to match organizational needs with computer system capabilities using detailed guidelines?	6	22	16	4	1

In the search for a method to obtain information about problems of computer conversion, this questionnaire was designed. It offered an objective method for analyzing the opinions and attitudes of various DP managers.

(Continued from Page 43)

square statistic used for comparison was 9.49.

Because there were five possible answers and a total of 50 respondents, a fixed value of 10 was used as expected frequency. This result allowed a 2-by-5 table to be used for computing the chi-square statistics.

Systems Management

Many times DP managers will not admit to some of the difficulties they encountered during the conversion of their systems. This conclusion was summed up best by Paul Jarvis in an article in the September 1973 issue of *Datamation* magazine:

"When you do find similar problems in 'the change' that another user has experienced, he will tend to minimize the difficulty his shop experienced. He is not being difficult. It's just that, as with the member of any infant professional group, he doesn't want to appear dumb."

It is true that all managers have some form of a plan or approach to conversion; however, questions can be raised about the efficiency of the plan, the time necessary to execute it and the final cost. One respondent answered that he felt strongly about his guidelines being adequate, but in a comment stated, "They started their conversion process more than four years ago and are still in the process."

There was no significant evidence found to indicate that those installations without guidelines had more problems than those installations with guidelines. The problems that are encountered during a conversion are those that would be unique to that installation. A problem to one manager may not necessarily be a problem to another.

Approximately 60% of the respondents had selected a special staff for the conversion process, and only in specific instances did the managers with a special staff answer the questionnaire significantly differently from those managers without a special staff.

Because large computer systems require long-range planning, it is necessary for the DP manager to be well aware of the rapid advances of technology. This knowledge can perhaps prevent the new system from becoming obsolete before it is completely installed.

At this point, detailed planning is critical. If the transition is not smooth and many unforeseen events occur, the result will be disastrous, both financially and in the length of time necessary to complete the conversion.

In the replies received, 26% strongly agreed and 32% agreed that detailed guidelines would reduce conversion time significantly. On the other hand, 18% disagreed and 20% had no opinion. There were no strong disagreements.

Time as Money

It would seem obvious that if time were saved, money would also be saved. In the case of computer conver-

sion, this does not always hold true. Sometimes if more time is taken in planning, money is saved in the end.

The managers in the survey agreed with this opinion. While 32% strongly agreed and 48% agreed that detailed guidelines would decrease costs, only 6% disagreed with that hypothesis. There were no strong disagreements, and 12% had no opinion.

The abolition of disasters during conversions is a DP manager's dream. However, to keep these unforeseen events to a minimum is the best managers can do. It is extremely difficult to eliminate all bad experiences in a complex system conversion.

Detailed planning seems to be at least a partial solution to that problem. Many managers seem to concur with that idea. Twenty-two percent strongly agreed and 50% agreed; 14% had no opinion, but 12% disagreed and 2% strongly disagreed. One respondent stated, "No amount of planning can reduce unforeseen events."

Personnel Management

The key ingredient in any conversion effort is the personnel. The personnel involved in a conversion must be given first consideration. As described earlier, there can be no success without the full support and cooperation of the personnel involved, directly or indirectly.

No computer system's function can be effective without a conscientious application of sound employee management practices. According to the study made by the National Industrial Conference Board, management must:

- Develop a well-defined recruiting program and execute it carefully.
- Practice consistency in the management of staff personnel.
- Spell out clearly specific responsibilities in project assignments.
- Establish a planned program for performance evaluation.
- Be able to motivate staff members on the basis of the business purposes of their activities.

Hand in Hand

Robert J. Benjamin put it in perspective in his book, *Control of the System Development Cycle*, when he stated, "A wise organization realizes that authority and responsibility go hand in hand with motivation."

The managers polled in the survey were in general agreement that guidelines for conversion would help minimize people problems. While 82% of the managers agreed that communications channels could be controlled better with detailed guidelines, the remaining 18% disagreed or had no opinion.

This illustration does not indicate which approach is best, but it does emphasize the differences in managerial styles. However, those managers who run the "whole" show have a higher risk of failure, because the job is too large for one person to handle.

Among the responses of the managers in the survey, there was a general concurrence that detailed guidelines for conversion can be helpful in reducing personnel problems. Of those managers responding, 70% agreed that detailed guidelines would tend to cause more cohesiveness among workers affected by the change, while 12% disagreed and 16% had no opinion. In the same line of thought, 80% of the responding managers felt that set guidelines would help the assignment of responsibilities during the conversion period; the remaining 20% disagreed or had no opinion.

While it was not the purpose of the project to examine personal motives of DP managers, certain paradoxes were apparent in some of the answers. Questions 5, 6 and 7 dealt with management support. The responses to these questions are compared in Figure B.

It is interesting to note the difference in the opinions of some of the managers when answering questions concerning upper management. While 22% strongly agreed that upper management supported the conversion effort, only 12% strongly agreed they could get upper management support

(Continued on Page 46)

Question	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree	Total
5	22%	50%	4%	18%	4%	98%
6	12%	50%	22%	12%	0%	96%
7	12%	36%	30%	18%	2%	98%

Figure B

Hypothesis	Question Number	Chi-Square
1	10	49.7
2	8	38.7
3	17	33.2
4	4	23.7
5	11	49.8
6	3	41.6
7	6, 7	35.8, 18.7
8	2	31.3
9	15	12.6

Figure A

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IN DEPTH

(Continued from Page 45)

with set guidelines.

In addition, only 4% had no opinion about upper management giving support, but 30% had no opinion about obtaining upper management support with set guidelines. After reviewing the replies, no pattern was found; so no speculation can be made about the results.

As mentioned earlier, different managerial styles have developed as a result of the new technology. The old styles could perhaps be referred to as "by-the-book" methods. Because it was felt that there was only one way to do things, one could follow a documented step-by-step method and accomplish the necessary objectives.

Organization Management

Today, managers use many different methods such as management by objectives, management by insight, management by results and management by crisis.

This many-faceted approach to management is evidenced by the responses of the managers in the survey. When asked, "Could people relationships be controlled better by guidelines for conversion than day-to-day management?", 44% responded that guidelines were better, while 32% felt that day-to-day management was better. The remaining 20% had no opinion.

When asked if organizational needs could be matched with computer system capabilities by using detailed guidelines for conversion, 32% had no opinion, and while 56% agreed to this point, 10% disagreed. Three questionnaires were left blank on this question.

It seems as though this aspect of systems capabilities is not considered by many managers.

In sum, in testing certain hypotheses as to whether detailed guidelines would be helpful in a computer conversion, it was found that in certain tangible areas the hypotheses were accepted. However, in certain intangible areas of management, the hypotheses failed the test and will not be accepted.

It is obvious that today's managers have developed a myriad of styles and have many approaches to similar problems. Because the results were based on the opinions and experiences of the managers, it is safe to say their answers applied to their unique situations.

It is difficult to categorize a topic that is basically general in nature, but the problem of conversion is one that will plague the DP manager until the end of time, unless some approach is developed that can offer some guidance that may be used in any situation.

Part III of this series will attempt to develop guidelines flexible enough to be useful regardless of type of business, size, organizational structure or type of conversion. These guidelines are not to take the place of or change the style of the manager, but to give guidance when necessary.

Benjamin E. McMillan is a specialist in computer systems acquisition for General Dynamics Corp. in St. Louis, where he has been employed for 12 years.

His work involves identifying opportunities for standardization and multi-site utilization and volume purchase and/or lease arrangements for equipment, materials and supplies for computer centers. He investigates new equipment and supplies as they reach the market and arranges to test, evaluate and make recommendations on their use by DP organizations within General Dynamics.

He also assists computer centers in preparing forecasts of future equipment and material needs.

McMillan holds a B.S. in mathematics from Central State College in Edmond, Okla. and an M.B.A. from Pepperdine University of Los Angeles.

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EDITORIAL

Dangerous Proposal

The Federal Bureau of Investigation has been trying since 1973 to add equipment to its National Crime Information Center (NCIC) that would allow it to switch messages between the states. Most of these messages are currently handled by the National Law Enforcement Telecommunications System, a nonprofit organization supported with funds from the states.

The proposed FBI communications service would be available at no charge to the states. In these days of austere budgets and Proposition 13 mentality, such a free service would probably make many state officials very happy.

However, they would be very short-sighted.

A switching system would give the FBI the capability to monitor and control data communications and all administrative messages between the nation's state and local police departments. Such powers of surveillance and control could change the FBI from an organization created to fight federal crime and *support* state and local law enforcement agencies into a national police force. A national police force that smacks of the Soviet KGB or Iran's Savak is anathema to the American political system.

It was, therefore, good news when Congress prohibited the procurement of message-switching equipment through language in the Justice Department's appropriations bill [CW, May 28]. Irene Emsellem, a senior staff member of the Senate Judiciary Committee said it well: "The main fear is that with respect to any kind of computerized system, the technology has a way of overshadowing the policy and then once the technology is in place, the policy questions don't get debated."

The Office of Technology Assessment (OTA) is working on the answers to those policy questions, and it is unlikely that Congress will allow any kind of new system to be installed at the FBI until those questions are answered.

The FBI is lobbying hard against the current wording of the Justice Department appropriations bill. Last month, FBI Director William H. Webster appealed to Senate Judiciary Committee Chairman Edward M. Kennedy (D-Mass.) for help in obtaining "a desperately needed communications controller" to be "the interface between the NCIC computer and dedicated communications lines which link it to criminal justice agencies throughout the country."

Webster told Kennedy the NCIC's current hardware is "technologically outdated, operationally overextended and unable to cope with the constantly increasing use of the NCIC system."

The center's equipment probably is swamped and behind the state of the art, but that does not justify its applications.

Besides heeding the OTA report, Congress should consider the legacy of Watergate and the man who ran the FBI for decades as a personal fiefdom. After all, proposals for FBI message switching were planned under a Presidential administration whose disdain for civil liberties are well documented.

DATA PAST

Five Years Ago
June 12, 1974

STAMFORD, Conn. — The Computer Investors Group (CIG) introduced the 6780 block multiplexer channel, the first independently available channel for large IBM machines. The system allowed 360/65s and larger systems to attach IBM 3330 and 3330-11 disk drives, IBM 2305 fixed-head disks, Storage Technology Corp. Superdisks and most independent 3330/3330-11 type replacements to their mainframes without software modification.

Eight Years Ago
June 16, 1971

HAWTHORNE, Calif. — "Dinosaurs in the computer industry have got to go," Cmdr. Grace Murray Hopper said here as she renewed her battle against what she called mammoth computer systems, operating systems, management data bases and massive mathematical problems. "You do not know how much economy you have lost to overhead by having an operating system and on top of that a management system. It must be eliminated," she said.

LETTERS

Parker on Crime Bill

I wish to clarify my position on the Ribicoff Computer Crime Bill [CW, May 21]. I have said that the first version of the bill (S.1766) was poorly drafted. I also said that the second version (S.240) is an improvement but still caused problems.

However, I am confident that these problems are being solved, and an adequate version will be produced.

We need a strong federal criminal law as Sen. Ribicoff has proposed and for exactly the reasons he has stated. He is doing a great service towards making society safe in the use of computer technology.

My statements have been aimed at alerting the computer community to the hostile environments in which we find our computers today. We must mend our ways of casual attitudes about security and unauthorized personal use of computers. They are rapidly becoming vaults in which we store increasing amounts of assets. You don't play games in vaults.

Donn B. Parker
Los Altos, Calif.

Don't Aid the Draft

As the front-page article in the May 7 issue points out, the revival of draft registration and conscription is a subject much on the government's mind these days. And this time around, computers will take on a larger role than ever before.

We, the men and women of the computing profession, must ask ourselves to what extent we are personally willing to become involved in this effort.

Conscription is slavery. Registration is the first step toward conscription. Any computer person who helps the Selective Service in its efforts to computerize the process is no less a participant in slave trading than the Yankee shippers who worked the infamous slaves-to-molasses-to-rum triangle in the early years of our nation's history.

Can we, if called upon to produce the files desired by the Selective Service, quietly submit on the grounds that we are only doing our job? I for one will not. As an employee of Stanford University, I will not knowingly comply with, aid or abet any effort to turn over computerized student records even if mandated by law. However, if the university chooses to modify its files so as to make them less useful for registration (for example, removing any age data), I will be more than happy to volunteer extra hours.

I urge all concerned DP people to serve similar notice on their employers. To assist in that effort, I have formed Computer Professionals Against the Draft, to provide a network of support for such individuals. For more general information on fighting the reinstitution of conscription, I refer the reader to The New Resistance, c/o Students for a Libertarian Society, 1620 Montgomery Street, San Francisco, Calif. 94111.

June R. Genis
Redwood City, Calif.

Next Century

With the approach of the 21st century and the impending problem of 01/01/00 being greater than 12/31/99, the optimistic systems analyst will begin designing his system dates with a two-digit century code while the super-optimistic systems analyst will decide that two digits are not large enough.

Terry Nickerson
Chattanooga, Tenn.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

HUMAN CONNECTION/Jack Stone

Reader Urges Users, DPers Share Ownership

Well, who does, or should, "own" the system — the user or the DPer?

To me, the answer is obvious: the user ought to own the system. In theory, anyway. But, in practice? Something else again.

There are many reasons why most users do not and, perhaps, should not execute their ownership responsibilities, and they can be related to this simple note: if the user group does not have the knowledge or experience or capabilities to handle their part of the systems job, then they shouldn't "own" the system.

Here is the response of Richard M. Dawson, manager of corporate systems and procedures for the Gilford Instrument Laboratories of Oberlin, Ohio, to my recent exhortations about systems ownership by our hallowed users [CW, Feb. 5].

First, he noted that the feelings on both sides of the DP social chasm are probably mutual and that neither the user nor DP group has an enviable record of consistent achievement. "Your (column) contained several elements of truth that depicted user departments as unsympathetic, less than cooperative antagonists. I'm sure that most 'data processors' have experienced the frustrations caused by inadequate project definitions, changes in systems concepts and lack of user participation throughout the project life cycle. I am equally sure that a great deal of user departments have not accepted the responsibility for project implementation.

"The trust of the matter, however, can be equally as disastrous if the next group you address happens to be a DP audience and they are asked to comment and rate their users. The same catcalls and jeers might be expressed."

Paragons of Proficiency

He suggests that, perhaps, the DPers are not the paragons of proficiency in their own right, when he says, " . . . DPers have been equally guilty of less than adequate performance during the implementation of a computer system. User departments might point out the fact that they would not accept the project leadership role because the DPer was reluctant to allow this to happen, since, for example: the stock items were really 50,000 all along and the systems analyst hadn't dug deeply enough into the present system to realize this; or the project specs were changed because a system walkthrough was never conducted; or the concern regarding the length of time to process the system came as a direct result of comparing the system test version to the operational version of the system; or there was a reluctance to accept the ownership of the system because the final product was not what was promised."

Two Theses

In my article, I constructed the thesis that the user was the real "owner" of the system and implied that unless the user acted in ways that ownership requires, the system was doomed, at worst, to abject failure, and, at best, to gross mediocrity."

But Dawson takes a different position, and notes that "joint ownership" is both necessary and possible through intelligent management: "In the end, both the DP people and the user share equally in the pride of authorship and the responsibility for 'owning' the system. The real success stories are usually the result of good project team training prior to the start of a project. They become equipped to handle the responsibilities of project leadership.

"Good project management techniques provide a measurement tool to ensure that there are no surprises midway through the project life cycle. Removing the user from all, or part of, his daily job-related activities allows him to spend the time required on project tasks. Systems testing in an 'on-line' environment removes the surprises and shocks when the new system is merged into the operating schedule of other production jobs."

Dawson's letter closed with an expression derived from the kind of levelheadedness that is desperately needed in this business: "It is time that the finger-pointing and excuses for systems that are inadequate fall out of the 'blame' mode, and users and DPers alike realize that they each have much to learn. If the project is worth doing, it is worth doing well. The end result should be a common goal."

'In the end, both the DP people and the user share equally in the pride of authorship and the responsibility for "owning" the system. The real success stories are usually the result of good project team training prior to the start of a project. The team becomes equipped to handle the responsibilities of project leadership.'

THE TAYLOR REPORT/Alan Taylor

Secrecy Clauses Often Mean Trouble for User

From time to time during the past decade, computer contracts with various types of secrecy clauses have come up in my professional life (outside that of being a columnist), and some of these cases, which are now both public and old, pointed up nasty problems that can result from such clauses.

Secrecy clauses are quite common in software contracts. They appear in proprietary software and in facilities management contracts in particular, although they can be included almost anywhere. The rationale behind them is that they are needed to protect some commercial interests from being taken away by a programmer or operator when he leaves the user company.

However, while secrecy clauses are needed, they often are dangerously broad in printed form contracts.

The standard item is a secrecy clause on the programs and documentation. One contract that had this was between Western Union Computer Utilities (Wucu) and one of its franchisees. One time the question was raised as to whether Wucu had rendered such bad service to the franchisee that it had breached a court order that it continue to service the franchisee. In this context the question came up as to whether Wucu had a duty to maintain the software promptly.

The secrecy clause prevented the supplied programming material or decks from being revealed to any nonemployee. The franchisee employed no programmers, since the idea of the Wucu franchises was, and had been, that the programs were to be developed centrally and the franchisees would only need operators and salesmen.

Wucu's position was that mere delays in maintenance did not in any case bring the company into contempt of the court's order because the franchisee could have taken the defective programs — which were written in RPG — to some outside person and been able to continue in commerical operation.

But since, under the secrecy clause, the user could not reveal the programs to nonemployees, and had no programmer employees, it could not do the maintenance.

Therefore, using a different legal principal which is far too often ignored — that a contract is supposed to have some sensible objective, and is to be read that way — if the franchisee didn't maintain the programs within the secrecy clause, and since technical maintenance was necessary to make the whole franchisee idea work, then the contract (and the court order) did require Wucu to provide prompt maintenance.

Where is the "World Center of Computers"? Science City, Siberia? Minneapolis/St. Paul? Stevenage, Herts? Armonk, N.Y.? None of the above, according to Taylor, who will challenge anyone to disprove his nomination for the title next week.

That secrecy clause — and most others — lack proper explanations as to why, under what circumstances and with what precautions programs can be shown to outsiders. Unless these are included, the contract should not be accepted. It is simply too dangerous to accept very wide clauses, because management can be forced to compromise its legitimate rights, often quite unexpectedly.

Sam Freedman, a vice-president of Electronic Data Systems (EDS), has detailed just how such forced use of contract clauses occurs. The general EDS facilities management contracts often have secrecy arrangements that are even more stringent than normal, as EDS claims that the operational methods are themselves secret. The contracts have two secrecy areas, one covering the programs, documentation and anything that makes up the "sys-

(Continued on Page 50)

the hexadecimal kid and his faithful dog ascii

A FANTASY IN SIXTEEN BITS

by Richard Forsyth

BIT 6
NOT A BIT OF IT

Dr. Null, who intends to destroy the world by putting the Network operating system into a gigotic loop, has gained control over the Hexadecimal Kid's faithful dog Ascii by converting him to Ebcdic. He has also apparently persuaded Hex to work for him.

As soon as they had gone, Fetch turned to the others and said: "I don't like the look of this."

"Not at all," Execute agreed. "The Kid is acting extremely suspiciously. I think our loyalty to the System must take precedence over obedience to his orders."

"You don't think he could have some trick up his sleeve?" Simula asked.

"I doubt it," Fetch replied, "and in any case we can't afford to risk it."

"We have to do something, and quickly," Execute added. "I vote we put paid to Ascii and then trap that miserable human in the workshop."

Ascii growled.

"I agree," Fetch said, "and when we catch Dr. Null, we must destroy him at once — whatever happens to the Kid. All right?" The other two nodded reluctantly.

Fetch and Execute turned to face Ascii, who was already lying down and nonchalantly scratching his left ear. Then, at a glance, they pounced on him together. With a bloodcurdling yelp, Ascii fixed his baleful eyes on Fetch and turned his lasers up to full power.

"He's frying my chips!" Fetch gasped in horror as he collapsed in a cloud of smoke.

Ascii snarled, gripped Execute's

(Continued on Page 52)

LETTERS

Payroll Updates . . .

This is a response to John White's letter, [CW, May 21], in which he complained about the new earned income credit payment feature that all payroll systems will need to accommodate as of July 1.

Let it be known throughout the entire computerworld (no pun intended) that the ASAP payroll/personnel system, developed, marketed and maintained by Argonaut Information Systems has been enhanced to include this feature. The tax calculation module, Taxbreak, which is included with the payroll/personnel system and is also marketed separately, has also been modified to perform the necessary calculations.

None of Argonaut's users will have to throw out all the checks they have in stock since this income credit prints on the check stub as one of the pay categories provided for in the employee's master record.

Sheldon Ellish
Vice-President
Argonaut Information Systems, Inc.
Oakland, Calif.

. . . Handle Ruling

In reference to the letter to the editor from John White [CW, May 21], the Cyborg payroll/personnel system will handle the advance earned income credit payment. This feature was recently added to our system and distributed to our clients free of charge. Furthermore, the implementation of this feature does not require any changes to the check stub layout nor is a master file conversion necessary.

It sounds as though White's payroll system suffers from the same problem that plagues most payroll systems: lack of flexibility. Unlike most business applications, payroll is exceptionally vulnerable to change because of government regulation changes. And if past performance is any indicator, there'll be plenty more changes coming.

Richard M. Skibski
Cyborg Systems, Inc.
Chicago, Ill.

"Our 33502, with 635 megabyte capacity, is the better business decision."

Jim Cron, General Sales Manager, Peripheral Systems Marketing

"Our 33502 has twice the capacity of an IBM 3350. So you can save dollars and floor space. And the improved technology behind our new 33502 data module offers other advantages.

"Better performance, for example. Track-to-track access time is faster than the 3330/3350 technology can offer. Average access time is faster too—19 milliseconds per 317.5 Mbyte logical volume. And you get more optional fixed head storage—1.72 Mbytes instead of only 1.14 Mbytes.

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"And when you choose Control Data's 33502, you needn't worry about conversion or compatibility problems. It is totally compatible with all IBM 3330/3350 disks and controllers. Our Storage Controller lets you intermix 100MB, 200MB, 317.5MB, 400MB, 635MB—even Mass Storage all on the same unit.

"Besides technical considerations, there are many other reasons that make the 33502 a better business decision. Control Data's reputation is for reliability, service support and broad product experience. And there are more reasons. For the full story contact your local representative, or call 612/553-4158."

CONTROL DATA CORPORATION

More than a computer company

Clauses Can Spell Trouble

(Continued from Page 49)

tem supplied"; and the other covering entry into any room where the EDS people are operating the system.

What they particularly lack, from the user's point of view, is not only the proper ability to handle contract breaches, as was the case with the Wucu contract, but also any adequate way to arrange for the replacement of the system at the end of the contract period (normally seven years). Further, the user can be forced to accept some totally new requirements of EDS as the price for doing the only other technically possible thing — obtaining some continued right to use the EDS-owned system when its seven-year term runs out.

In fact, according to Freedman, the clauses were included to force users to later agree to numerous new requirements, including that EDS be able to revoke the right to use the system and enter the customer's premises and computers to erase it, on a claim of contract breach, with no guarantee that the erasures don't put the company out of business. Another clause makes the customer legally responsible for anyone who might have proper access to the system. And once again, the customer is prevented from using outside experts to help maintain the system or even diagnose problems.

Finally, provisions make the alterations or improvements put in by the customer's employees the property of EDS!

The secrecy clauses, although they are claimed necessary to protect EDS, actually prevent the customer from monitoring contract performance or making necessary technical preparations prior to substituting another system.

As an end result, EDS is able, as Freedman said, to require customers to enter into pages of EDS-dictated terms.

Secrecy clauses are not always harmless, as many people believe. In fact, they can be quite dangerous unless carefully checked out.

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Mini/Micro79

The Far West Classic in the heart of California Computer Country

Here's a progress report on Mini/Micro79, the far west computer event of the year in the heart of the super-active Southern California computer market-place.

Mini/Micro returns to beautiful Anaheim Convention Center, September 25-27 with a terrific conference program and a timely, sparkling expo of brand-new products from chip-level to full systems, and including a new test instrumentation section.

In the column at the right are the names of 80 fine companies who form the preliminary list of exhibitors. And just below are the titles of 24 solid sessions, as selected by Program Co-chairmen Neil Kelley (Infosystems) and Bob Brown (Hewlett-Packard) and the 1979 Mini/Micro program committee.

The Conference program at a glance

Tuesday

AM
- Pascal on Minis and Micros
- Desktop Computer Applications
- Distributed Processing and Terminal Systems
- Computer Privacy and The Law

PM
- Future Developments in Small Computer Software
- Computer Graphics
- 32-Bit Machines and Other Megaminis
- Maintenance and Fail-Safe Operation

Wednesday

AM
- Military Microcomputers
- Data Base Management Systems for Minis
- Technology Impact on Data Communications
- Mass Memory Storage

PM
- Industrial Microcomputer Applications
- Success with Single-User Computers
- Telecommunications from the Terminal User's Viewpoint
- Printers and Other OEM Peripherals

Thursday

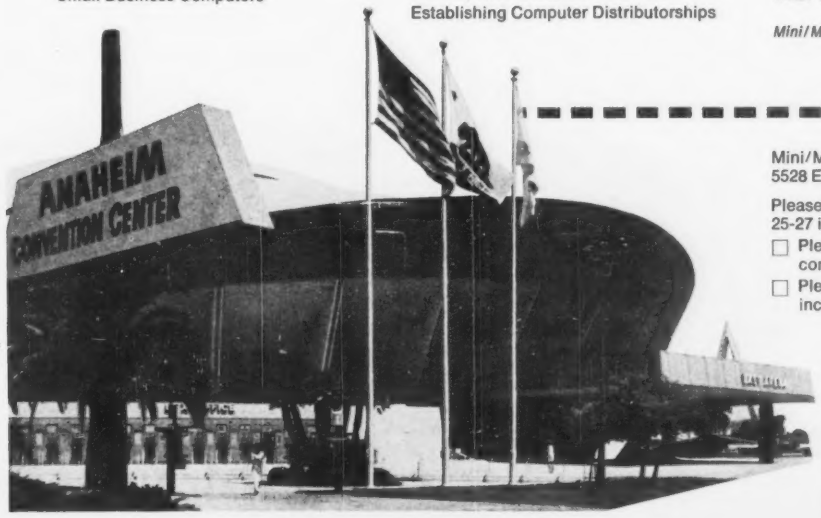
AM
- How Many Bits Do You Need?
- IBM-Software Compatible Minis
- Memories: MOS, Bubbles, and CCDs
- Small Business Computers

PM
- Micro Testing at Chip and Board
- "IBM Watching": Products and Marketing in the Eighties
- Development Software for MPU's
- Establishing Computer Distributorships

An Early-Bird List of Mini/Micro Exhibitors

Able Computer Technology
Addmaster
Aero Mayflower Transit
AFIPS
Anadex Inc.
Avanti
Ball Computer Products
Ball EDD
Benwill Publishing Corp.
Cahners Publishing Co.
Calex Manufacturing
California Computer Products
CAP-CPP Inc.
Centronics
Century Data Systems
Cipher Data Products
Columbia Data
Computer Automation
Computer Business News
Computer Interface Technology
Control Data Corp.
CW Communications Inc.
Data Electronics Inc.
Datum Inc.
Digital Equipment Corp.
Documentation Systems Inc.
Educational Data Systems
EECO
Epic Data
General Automation
Hamilton/Avnet Electronics
Haveg Industries Inc.
Hewlett-Packard, Desktop Computer Division
Hewlett-Packard, Systems Division
Interdyne Company
Intermec
Intel Corporation
International Data Corp.
international Data Sciences
IPI
Jade Computer Company
Kierulff Electronics Inc.
Lear Siegler Inc.
MDB Systems
Megatek Corporation
Memorex
Micom Systems
Microfocus
Mitsubishi Electric
Monolithic Systems Corp.
Moxon Electronics
NCR Corporation
Newport Data Systems
Paradyne Corporation
Printronix Inc.
Racal-Vadic
Randal Data Systems
Ramtek Corporation
Remex
Scientific Micro Systems
Sola Electric
Sord Computer Systems
Space Byte Computer Corp.
Summagraphics
Systems Furniture Company
Tektronix
Tele-Dynamics
Teletype Corporation
Telpar Inc.
Texas Instruments
3M Company
Triple I, Inc.
Western Digital
Western Peripherals
Wilson Laboratories
Wyle/Liberty Electronics

Mini/Micro Computer Conference and Exposition, Robert Rankin, Managing Director



Mini/Micro Computer Conference and Exposition
5528 E. La Palma Avenue, Suite 1A, Anaheim, CA (714) 528-2400

Please send me complete information on Mini/Micro79, to be held Sept 25-27 in Anaheim Convention Center, as follows:

- ☐ Please send me a detailed Preview Program (available August 1) with complete program, registration, and hotel information.
- ☐ Please send me complete information on exhibiting in Mini/Micro79, including floorplan and exhibitor services furnished.

Name _____

Title _____

Company _____

Address _____

City, State, Zip _____

LETTERS

More Structure, Please

Isn't it interesting to note that, according to Ed Yourdon [" 'Structured Revolution' a Failure," CW, April 9], the two groups (top management and trainees) who take to the "revolution" are the two groups that know the least about designing and writing programs?

Does this imply that some of these ideas can only be successfully promulgated to those who are unqualified to judge the technical merits?

It is, perhaps, small to take this opportunity to point out that Yourdon's own treatise on structured design would have been improved immensely if it had had a little more structure.

Margaret C. Millhoff
San Jose, Calif.

Memorial Scholarship

James L. Cross, director of communications and information systems at Memorial Medical Center, Corpus Christi, Texas, was killed last month in a diving accident off the coast of Yucatan. Cross, who was retired from the U.S. Navy, had been with the hospital since 1972.

A scholarship in his memory has been established at Del Mar College, his alma mater. Those wishing to donate to the fund may direct their contributions to the James Cross Memorial Scholarship Fund, Business Office, Del Mar College, Baldwin & Ayres, Corpus Christi, Texas 78404.

Roger C. Wilgus
Director, Information Services
Memorial Hospital
Worcester, Mass.

Simula Plans to Trap Dr. Null

(Continued from Page 49)

leg between his fangs and hung on grimly. The pair of them rolled around the floor in a crazy zigzag, but, try as he might, Execute could not shake him off.

Roused by the commotion, Dr. Null ran back into the room — to be confronted by the spectacle of Execute pinned to the ground underneath Ascii, with Fetch a smouldering heap beside them. "Well done, boy," he congratulated Ascii.

"Get this hound off me," Execute pleaded, "before he takes another byte out of my floppy disks."

"That is your own fault," Dr. Null admonished without sympathy. "You brought it upon yourself."

Simula was disheartened. She had seen Ascii transformed from a playful pet into a monster; she had witnessed Hex's blatant betrayal of the Network; and now Fetch had been burned up in front of her eyes. She could not have been more depressed if she had found an inconsistency in her block structure.

Unless something was done to stop him, this saboteur was going to corrupt the Data base and bring civilized life to a halt.

There was one last recourse left to her. It was apparent that the lecherous old villain found her elegantly indented form and harmoniously balanced parentheses attractive: she was prepared to sacrifice everything for the System.

"Dr. Null," she said, smiling directly at him, "I now see that it is futile to resist you.

"In my room upstairs, I have an X-ray lithography machine, used to etch printed circuit patterns onto microminiature semiconductor boards. Perhaps you would care to come upstairs and see my etchings."

"Most interesting, I am sure," Dr. Null said. "But why not bring them to the workshop?"

"They're too delicate," she replied, "and there are certain rather intimate items of software that I would like to show you which should not be disclosed in public."

"Delightful," Dr.Null said. Simula led him to her bedroom, filled with trepidation. Her main aim was to separate him from his ultraviolet Prom-eraser. Will Simula have to give her all for the System?

Don't miss the next gripping installment.

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Forsyth is software manager for RAIR Timesharing in the UK.

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Gehring Looks Ahead

'Explosive' Application Growth Seen

By Don Leavitt
CW Staff

BLUE BELL, Pa. — Good programmers have "job security that just won't quit" because there will be an "explosive increase" in the number and kinds of applications being run on computers, even in the early 1980s, according to Richard L. Gehring.

Clearly enjoying his role as president of Univac, Gehring explained in a recent interview that the growth will occur because in times of recession and in times of inflation — "and we have both now" — management will be more and more careful about the number of employees it hires.

The capabilities of DP "obviously allow us — businesses in general — to expand tremendously without expanding employment at anywhere near the same rate," the dark-haired executive added.

Mulling over some of the areas he will discuss at a Society for Management Information Systems symposium later this month, he said the power of the computer is moving out to the user areas "and that's not a bad thing."

Richard Gehring will be among the speakers at the National Forum on Information Resource Management, to be held at Chicago's Drake Hotel June 25-26, sponsored by the Society for Management Information Systems. For more details, contact SMIS Forum, 12611 Devan, Silver Spring, Md.

It's quite common now to see CRT terminals in manager's offices and to see them being used by the manager as well as by subordinates to get information when they want it — "when they need it, to make decisions." The days in which the manager has the clerk "do the dirty work" are gone, in Gehring's view.

The growing use of CRTs provides at least a partial answer to another problem facing all businesses today: the upward spiral in the cost of paper "and the cost of storing it when you do buy it," he added.

Distributed data processing (DDP) still lacks a hard-and-fast definition, Gehring agreed, "but in essence, it's an approach that puts the intelligence of the system closer to the user, wherever he is." That is good, he said, because it cuts the cost of communication between the user and the central computer, if there is one.

Gehring seemed to have some doubts about the "distributed" approach that puts dedicated minis or other processors out in the application areas. It would be difficult for the DP manager to maintain control of such systems and that in turn could mean the organization would lose whatever advantage it might gain from a more coordinated effort, he said.

What about distributed data bases? Aren't they one possible way to let users work independently on data that is significant to them but allow access by anyone who needs it, at whatever level? Conceptually, such systems would solve problems, Gehring said, "but there still isn't a clear definition of how a distributed data base should function."

Some observers argue that the computer performance evaluation (CPE) specialty may be on the wane with the introduction of bigger and bigger and faster and faster processors, but Gehring is of a different opinion. Upper management has recognized the need to control DP costs and end users are getting more sophisticated in their concerns as well, he said.

IBM-Based Mark 3000 Service Provides MVS on GE's Network

ROCKVILLE, Md. — The Mark 3000 service now available from General Electric Co. gives users stronger IBM-oriented capability than was previously accessible to them through the GE Mark III remote computing network.

Backbone of Mark 3000 is an IBM 3033 running under OS/MVS including the MVS systems extensions (MVS/SE), the Time Sharing Option (TSO), JES2 for local and remote-batch job I/O and Remote Access Control Facility (RACF) for security.

The new CPU replaces an IBM 370/168, a spokesman noted.

For the moment at least, GE is still referring to the service as "IBM-compatible" since access to the 3033 is only accomplished after sign-on and access to the foreground hardware, which currently is Honeywell, Inc. 6600 equipment.

Included in the communications services available under Mark 3000 is DSXMIT2, which was designed to allow a user to connect his in-house IBM System/3, 360 or 370 to GE's 3033 in 2780/3780 mode.

This service enables users, for example, to put their files on the network for interactive query and update during the day but to transfer the updated file back to its "home" data center in the evening, for whatever batch processing is needed.

To support the users on Mark 3000, GE now supports both the Mark IV file management system, several of its application-specific derivatives from Informatics, Inc. and the System 2000 data base management system from MRI Systems Corp. Modeling or simulation support includes both GPSS from IBM and SPSS from SPSS, Inc., the spokesman continued.

Application packages available in either "off-the-shelf" or customized mode include Wang Laboratories, Inc.'s payroll system as well as four systems — general ledger, accounts payable, accounts receivable and fixed-assets accounting — from Software International.

Users can find utilities from independent software companies on the updated GE service. These include, for example, the Fast Dump Restore/Data Set Functions (FDR/DSF) from Innovation Data Processing, Inc., the Librarian from Applied Data Research, Inc., Syncsort from Whitlow Computer Systems, Inc. and the QED TSO editor from Triangle Universities.

A changeover to direct access to the 3033, presumably through a separate dial-up telephone number as well as different sign-on procedures, will be instituted in about six months, he estimated.

Users will be charged along the same lines under Mark 3000 as they have been under Mark III, although the specific charges — including monthly minimums, for example — may differ, the spokesman said from 401 N. Washington St., Rockville, Md. 20850.

Programmer Support Enhanced

PRINCETON, N.J. — Version 2.1 of Vollie, the on-line program development package from Applied Data Research, Inc., includes extended support for both applications and systems programmers; enhanced security; and screen formatting capabilities for Voice, Vollie's interactive programming language.

Running under any CICS DOS/VS or DOS/VSE environment with IBM 3270 CRT terminals, Vollie includes an on-line file system, on-line data entry and full-screen editing capabilities, facilities for remote job entry and remote job output — under Power/VS or VSE/Power — and on-line maintenance for various program and procedure libraries.

Enhancements for the application programmer include assigning commands — including execution of Voice procedures — to PA and PF keys, executing Voice procedures directly from a sign-on, displaying different parts of the same member at the same time and printing directly to system line printers as well as 328X printers, according to a spokesman.

Under Vollie 2.1, systems programmers can rename or delete files on any accessible on-line direct access volume, display volume table of contents (Vtoc) information for an entire volume, display and modify areas in main memory and enter a DOS/VS or DOS/VSE operator command from a Vollie terminal, he continued.

Voice enhancements include screen formatting, the ability to use hexadecimal data in a Voice procedure and the ability to pass control from a Voice procedure to a user-written CICS program.

Security facilities now include an exit route at the command level and an update exit routine for the immediate update of program source statement or procedure libraries, the spokesman said.

Vollie is available on a permanent license basis for $12,300 or on rental or lease plans ranging from $295/mo to $445/mo, the vendor noted from Route 206 Center CN-8, Princeton, N.J. 08540.

Decus Meeting To Cover RSTS

HALIFAX, Nova Scotia — The first Atlantic Decus Symposium, to be dedicated to the subject of Digital Equipment Corp.'s RSTS operating system, will be held here Oct. 10-11.

Special presentations are planned to cover such areas as computer communications, Pascal and DEC-20 considerations.

DEC representatives will be in attendance, and the firm will display its equipment.

Registration for the symposium is limited to 200. Advance registration (one month ahead) is $95. The fee for those who preregister but wish to pay at the door will be $110 and the charge for registering at the door will be $120.

Further information and registration is available through Anne Betz, administrator, Decus Canada, Digital Equipment of Canada, 100 Herzberg Road, Ottawa, Ontario K2H 8K8.

ACT Enhances Macro Generator

NEW YORK — Described as a tool for building translators, aids and macro processors for virtually any programming language, the Help II Translator Writing System (TWS) can execute on any CPU with 64K bytes of storage, according to the vendor, Advanced Computer Techniques, Inc. (ACT).

The software is configured around three basic facilities. A pattern-matching language supports syntax checking; a macro language provides code generation; and an editing language supports the formatting of output strings.

This organization encourages modularity and good programming practices. Help II TWS application are concise, readable and easy to maintain, a spokeswoman claimed.

Help II TWS is based on an extremely flexible macro language that can be used in a variety of ways, she said. It can, for example, extend programming languages, convert programs from one language dialect to another, implement programs or enhance the readability of source listings.

Other possibilities include support for standards enforcement, reduction in coding effort, the generation of entire systems from one set of parameters, or substitution of simple language interfaces.

Although Help II TWS can be used by those without backgrounds in language processing, it is generally considered a tool for the specialist. For that reason, it is marketed both as a product for installation at a user site and as a service, the spokeswoman said. She declined to provide cost figures for the service, however, noting that there are too many variables to consider.

The generalized Help II TWS package costs $15,000 and is currently implemented on IBM 370 and Honeywell 6000 mainframes. Macro processors for Cobol, Fortran and assembly language — based on Help II techniques — are also available, ACT said.

The company is at 437 Madison Ave. New York, N.Y. 10022.

Pcos Extends Dibol Usage

W. CALDWELL, N.J. — The Plug-Compatible Operating System (Pcos) introduced recently by Information Access Systems, Inc. (IAS) provides users of Digital Equipment Corp. DPD-11 and LSI-11 equipment with multiple terminal support and an enhanced environment for Dibol programs, according to a spokesman.

Pcos is an extension of the Dibex Run-Time System that IAS announced in 1976. Extensions to Dibol built into Dibex include COPY/INCLUDE, IF . . . THEN . . . ELSE and WHILE statements. Dibex also provides for binary field manipulation and support of group levels, the vendor said.

The system incorporates virtual memory and optimization techniques to enhance both the capabilities and performance of the users programs. This has been done through demand paging and dynamic memory allocation, without affecting the compatibility of existing applications, the spokesman claimed.

Extra Jobs Supported

Current users of Dibex have found that two or more extra terminals or jobs could be supported on the same hardware once Pcos was installed. In addition, a "significant" improvement in performance was noted over swapping type systems, especially when executing on smaller, slower disk subsystems, he asserted.

A Multiterminal Program Development (MPD) facility enables users to create programs while concurrently executing applications from available terminals. Pcos also supports Remote Program Development so that complete development work — including source code changes — can be handled from a terminal, the spokesman said.

A debugging capability pinpoints the location of software problems by stepping through a program and enables the user to interactively change the contents of fields. Program execution can be both interrupted and altered, IAS said.

Requiring a base hardware system with 56K bytes of memory, a real-time clock, a serial line interface, a terminal I/O device and a disk, Pcos costs $2,995 for micros and $3,745 for minis.

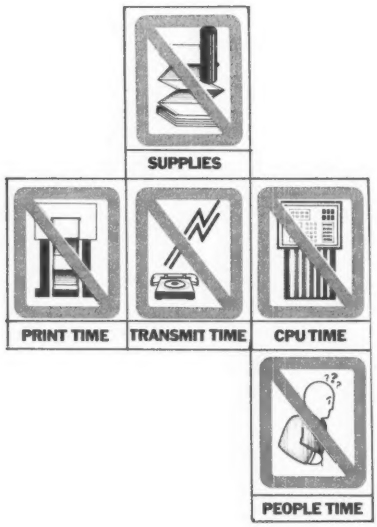
IAS is at 1129 Bloomfield Ave., W. Caldwell, N.J. 07006.

Harris Users Offered RPG-II

FT. LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division has announced the immediate availability of an RPG-II capability to run under Harris' virtual memory operating system, Vulcan.

Applicable across the entire Harris line of minis and mid-scale systems, RPG-II is compatible with IBM's System 3 implementation of the same language. It supports sequential, indexed sequential and direct access to files; Boolean logic operators; and Cobol-compatible subroutine calls.

The license fee for Harris RPG-II is $2,500, the company noted from 2101 W. Cypress Creek Road, Ft. Lauderdale, Fla. 33309.



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Codasyl Needed in DBMS Training: Roark

By Don Leavitt
CW Staff

WASHINGTON, D.C. — The Conference on Data Systems Languages (Codasyl) should help develop tools that allow users to "move old applications smoothly and economically into the more profitable data base management system [DBMS] environment," according to Mayford L. Roark, a user from a large DP installation.

Addressing the recent meeting held to commemorate Codasyl's 20th anniversary [CW, June 4], the executive director of Ford Motor Co.'s systems office said he recognized the economic potential offered by DBMS, but the cost of gaining them is still "formidable, if not traumatic."

Earlier in his talk, Roark recalled DP traumas from the days of conversion to third-generation equipment in the mid-1960s. Even then, however, he was "buoyed by a new hope that the transition to Cobol [then in its formative stages] would spare us from ever going through an experience of that sort again."

Cobol was developed by Codasyl to make business programs both easy to write and portable, and the hope offered by those goals has in large part been realized, Roark noted. Conversions at Ford now are measured in man-days per program, and "it is unusual that we run into a conversion involving much more than" three man-days.

Currently, Ford has some 1,380 computer systems — 85% of which are minicomputers or microcomputers — installed or on order. The company is using 10 different data base systems, so that gives "some chance to share many varieties of achievement and frustration," Roark commented.

Plea for Universality

The DP community really needs "the thing you set out to bring us a decade ago — a more universal language for data bases," he told the attendees. Codasyl achieved "less complete acceptance" with its specifications on DBMS than with Cobol because with DBMS it was a "late starter. Competing languages were already entrenched before the Codasyl solution appeared."

That, he added, is tragic because "for whatever its historical reason, this Babel of data base languages is one of the greatest inhibitors of data base development."

Roark pleaded "something like a universal data dictionary." Even today data dictionary offerings are "a competitive jungle with little in the way of common threads of concept or language.

"We have tried to identify some particular product that might have enough universal application to fit in all of our varied hardware and software environments at Ford," he said. "We found some fine products. We did not find a universal product.

"Perhaps Codasyl, even at this late hour, can do something" about defining a universal data dictionary, he noted hopefully.

Better Tools, Training

Better tools for monitoring and fine tuning data base applications were also on Roark's shopping list. To illustrate the problem, he told how one of his managers was uneasy with an activity that has a majority of its applications in DBMS mode.

The manager "found it difficult to determine when he had reached something like an optimum structure for his physical and logical data structures."

The DP community also needs better approaches to training, Roark said. "A successful data base venture needs a lot of people who understand what they are doing — data base administrators, programmers, users and even managers." Universities are beginning to respond to this need, "but they need to do a great deal more."

Suppliers of DBMS software have a wide range of offerings, with programmer courses ranging from two days to two weeks and data base administrator training ranging from two weeks to a minimum of nine weeks, he noted.

"Some of our people have achieved good results with very limited formal training; others have felt inadequately prepared after months of preparation," he said. "Is there a Codasyl role in data base training? Whoever fills the role, there is a great unmet need."

Distributed Net Problems

The problems of distributed networks and distributed data bases also have to be faced by the DP community, Roark continued. Ford's situation — sometimes involving Ford CPUs "conversing" with CPUs at other companies — is probably more sophisticated than many users face now, but such "communal networks" are in the foreseeable future, he warned.

"As you develop standards [sic] for DBMS networks, can you provide accompanying tools for network analysis and for security safeguards?" he asked.

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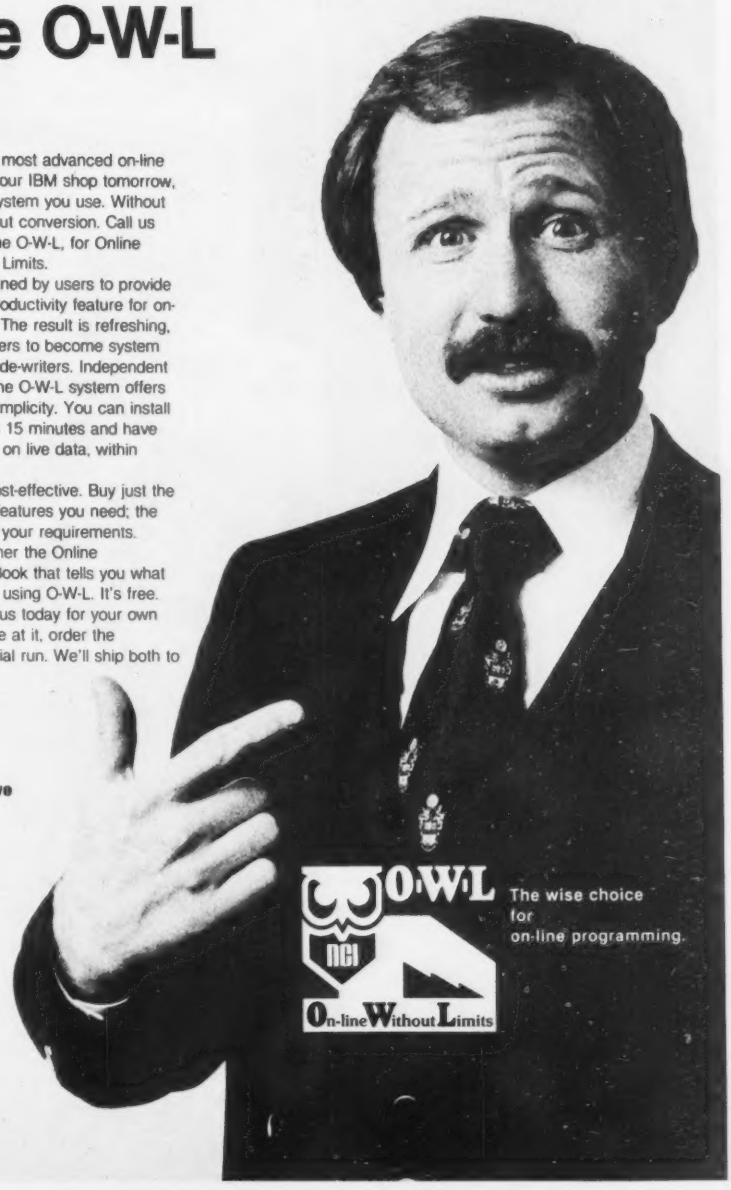

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digital

Security Risks Noted

WALTHAM, Mass. — Currently focusing on financial securities from the UK, but expected to cover other European and Asian securities later, the Risk Analysis Service developed by London-based Rowe Rudd & Co. Ltd. is now available through the remote computing services of Interactive Data Corp.

With the service, portfolio managers can screen the entire data base of risk factors to identify companies that meet user-specified criteria. In addition, users are given a monthly "Beta Book" containing risk characteristics and general information about nearly 1,500 UK companies.

Data for the Rowe Rudd service is based on five-year share price histories, which are recalculated and updated every four weeks. A command structure enables users to determine the beta and residual risk of a portfolio, update historic or current data on a particular company or screen and sort companies on a variety of risk characteristics, a spokesman said from 486 Totten Pond Road, Waltham, Mass. 02154.

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For Queries, Reports

Honeywell 66 Sites Offered 'AZ7'

BURLINGTON, Mass. — Previously implemented on IBM 360 and 370 mainframes and Burroughs Corp. mid-range systems, the AZ7 retrieval, report writer and file management package from Azrex, Inc. has now been adapted to the Honeywell, Inc. Level 66 environment as well.

AZ7's English-like command language uses a dictionary-driven approach that can be applied to both ad hoc and production report requirements. Retrieval requests use predefined dictionary tables which contain both data structure and text used for column headings and error messages.

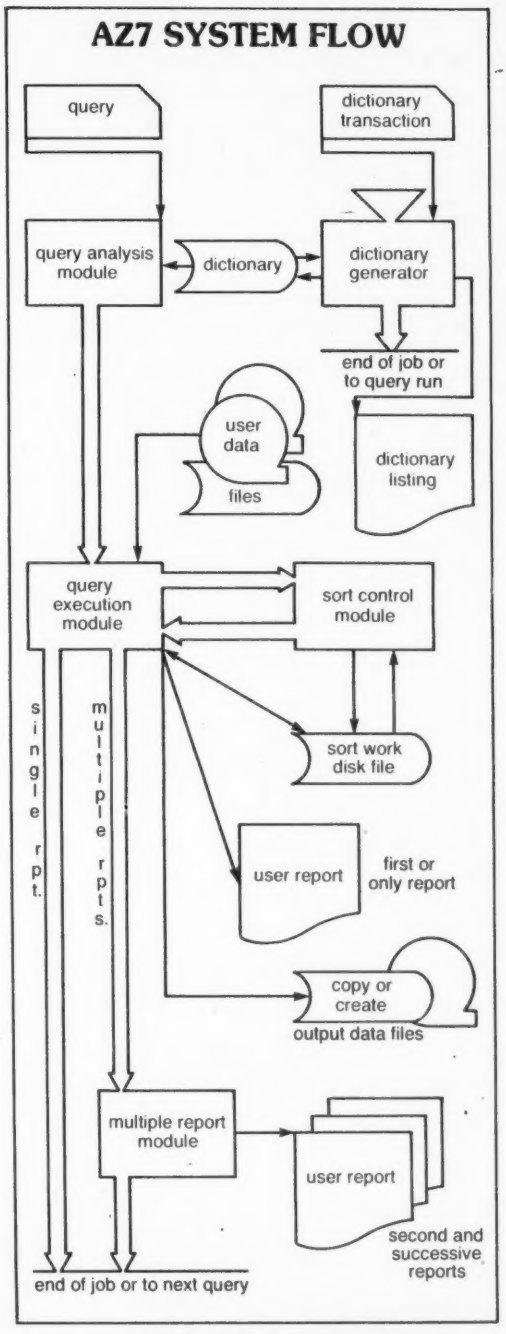
Capable of working with as many as three input files, the package includes a sort facility and support for generation of multiple reports from one pass of a file. Selection criteria can be expressed in statements combining arithmetic and algebraic calculations, according to a spokesman.

AZ7 was originally designed for batch work, but functions interactively in some of its implementations. The Honeywell version will initially have "pseudo-interactive" capabilities under Honeywell's Gcos TSS/Cardin environment, Azrex said.

The Level 66 version of AZ7 requires an ANS Cobol 74 compiler and up to 44K words of memory. Disk storage of about 2,000 Llinks is used during the run, but the work space is released afterward.

AZ7 costs $14,000 to $24,000, depending on the options selected, the company added from 3 Mountain Road, Burlington, Mass. 01803.

Diagram provided by Azrex details system flow of the AZ7 retrieval and reporting package.



'LTA' Tracks Lawyer Time

CINCINNATI — The Legal Time Accounting (LTA) package has been released by 21st Century Software to support timekeeping and billing for law offices with up to 12 attorneys. The command-driven package runs on the Poly Morphic 8813 desktop microcomputer.

LTA takes advantage of the 8813's memory mapped CRT to transform the system's keyboard and CRT into a control panel from which a secretary or clerk can enter pertinent attorney, client and case information.

The LTA costs $800, the vendor said from 3201 Carew Tower, Cincinnati, Ohio 45202.

'Resolve' Gets Option

SUNNYVALE, Calif. — An advanced early warning system (AEWS) has been announced by Boole & Babbage, Inc. as an extra-cost optional extension of the company's Resolve-MVS package that detects, diagnoses and solves problems that degrade performance or cause unscheduled downtime on large-scale IBM mainframes.

The standard Resolve-IMS provides services intended to cope with problems such as enqueue conflicts, reserve lockouts, thrashing and job looping. Features especially designed for the MVS environment include output in the form of histograms, Kiviat graphs and correlation trend plots, a spokesman explained.

The AEWS adds to Resolve's existing warning capabilities by providing the user with the ability to specify precise threshold parameters for selected resources. AEWS produces messages on the operator's console when resource imbalances or shortages occur.

The standard Resolve-MVS package costs $12,000 to $21,600 depending on the installation. AEWS is available for $2,500, Boole & Babbage said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

For Transmissions to Host

Three Emulators Unveiled for IBM 3270s

MEMPHIS, Tenn. — Software products to enhance the operation of any existing IBM installation using 3270 transmissions to the host system were announced here by the Minicomputer Division of Data Communications Corp. (DCC).

Three 3270 configurations are available from DCC — the Data Collection System (DCS), the Transaction Processing System (TPS) and the Data Collection/Transaction Processing Combination System.

The DCS offers a multiterminal, source entry system that incorporates formatting for flexible data entry/validation and data verification at the character level. It also can give security at the personal level, allowing operators to change terminals without losing output from previous jobs.

Other features include log-on and password security and a security system that permits only qualified personnel to access specific files and perform specific functions, DCC said.

The operator must select the required data base before file activity can begin, using a data entry mode for entering actual data with already-designed screen formats. He must verify the entered data either on a character basis or by visual scan using the "Key" and "Sight Verification" modes. If the data is changed during verification, the system forces reverification for accuracy by the operator.

The DCS allows a data base to be rewound to start at the first logical record for the next search, and system-generated production statistics are available by data base name or operator number.

The system supports up to 39 interactive terminals as well as user-defined multilevel file structures.

In addition, a Data Base Maintenance mode provides four utility functions: data base deletion, transferral, dumping and loading. Single keystroke switching to 3270 mode at any CRT station is possible, and the most recent 3277 screen format can be saved for redisplay upon reentry to 3270 mode, the vendor noted.

Simultaneous Manager

A multitasking, real-time system, the TPS simultaneously manages terminal, job and task control functions on an on-line business application. Major features are interactive inquiry and update; data base management; interactive data collection; multiterminal, interactive formatted data entry; and user-priority scheduling for applications job queue.

The system allows total independence of data entry and data manipulation, user-priority scheduling of output queue and user control of output media for jobs on out-

(Continued on Page 60)

Switching Systems Handle Office, Packet Applications

ISELIN, N.J.— Siemens Corp. has unveiled two electronic switching systems, one for the office and one for time division circuit, packet and store-and-forward switching.

The office-type switching system, the EMX 1010, is for text communications and combines switching and word processing functions. It provides electronic switching facilities for Telex, Western Union TWX and other types of data communications. The microprocessor-controlled unit has up to 20 line terminations with capability for expansion beyond 40 lines, Siemens said.

The EMX 1010 has random-access memory storage with floppy-disk program loading, and it can be totally configured by communication interface cards and software programming so that it combines the functions of a switch and a remote communications processor.

With complex Telex control, the system also features polled network operations for level 5 and 8 terminals with data speeds to 300 bit/sec. Asynchronous protocols are available for various interfaces including one for a packet switch, the company said.

To minimize the effects of a system failure, the system is connected to a public network line and would have a direct Telex line to one station inside the local network. In the event of a power failure, external lines would be automatically switched to internal terminals. System memory backup lasts up to four hours.

The EMX 1010 is available through the Data Communications Division of Siemens Corp., with deliveries starting in October. Prices range from $20,000 to $80,000, depending on the selected configuration.

EDX: Increased Capacity

EDX, the other Siemens offering, is a computer-controlled hybrid switching system that was originally designed for a maximum capacity of 4,032 lines, but has since been enhanced by forming switching blocks of 4,032 lines interconnected by a bus, greatly increasing system capacity.

The system also is available for small capacity configurations necessary for coping with the rapid growth of the Telex and data private automatic branch exchange (PABX) market, Siemens said.

System hardware consists of communications gear such as line terminators and a communications controller, a CPU to control the communications hardware and peripherals, and the peripherals themselves, such as console typewriters and disk and tape storage.

The operating system includes a control system and switching programs to run the EDX and language processors as well as utility programs that are based on users' specific requirements.

The EDX system can be exployed as a concentrator, terminal exchange, tandem exchange, an international gateway or a combination of all four as well as a PABX, Siemens said.

Protocols Supported

In the packet-switching environment, the EDX supports a number of protocols including the CCITT X.25 for packet terminals and X.3, X.28 and X.29 for the Packet

(Continued on Page 60)

Burroughs Terminals Linked to Tymnet

CUPERTINO, Calif. — Tymnet, Inc. has announced a service that allows users of Burroughs Corp. CRT terminals to interconnect with any host mainframe — Burroughs or not — connected to Tymnet's public packet switched network.

With Burroughs Poll/Select Terminal Handling Protocol, terminals are connected to local Tymnet network access nodes through multidrop leased circuits. The local node handles all polling/select requirements so the host computer is relieved of that overload, Tynmnet said.

The service functions with any Tymnet-connected computer through asynchronous or synchronous Tymnet host interfaces, with a $100/mo charge for a dedicated port for multidrop line.

Using "standard 1,200 bit/sec pricing," Tymnet quoted rates of $2 per connect hour for high-density locations, $5 per hour for low-density areas, $6 for foreign exchange locations and $15 for incoming Wats. Transmissions cost 3 cents per 1,000 char.

Tynmnet is at 20665 Valley Green Drive, Cupertino, Calif. 95014.

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For Systems Running Under AOS

DG Eclipses Get IBM 3270 Emulation Software

WESTBORO, Mass. — Data General Corp. has announced IBM 3270-compatible software for Eclipse computer systems running under the Advanced Operating System (AOS).

The AOS Remote Cluster Executive 70 (RCX70) is the first interactive communications protocol offered by DG and provides both 3270 emulation and "an easily understood" applications interface, a spokesman noted.

RCX70 software emulates IBM 3271 cluster controllers, allowing tasks and terminals to appear as IBM 3271 cluster controllers and 3277 terminals to the central-site host computer. It also allows the implementation of distributed applications processing and local stand-alone processing and supports concurrent communications with DG's other IBM-compatible communications packages running in the same AOS-based Eclipse system.

The RCX70 emulator runs as a separate process under AOS, concentrating information entered on AOS terminals and supervising the communication of the data to and from the local Eclipse system terminals. The data can be routed to the IBM host computer or to another AOS program residing in the local Eclipse computer system, DG explained.

The software allows several AOS-based Eclipse systems to be added to an existing multidrop communications line servicing IBM 3270 series equipment. The Eclipse system can share the same line with 3271 controllers, DG added.

Concurrent Emulation

An Eclipse system running under AOS can be connected to several communications lines to allow interactive 3270 emulation concurrently with remote job entry emulation such as Hasp II or 2780/3780.

Up to 16 terminals connected locally or through dial-up or leased lines are supported by RCX70 at each Eclipse system.

The local Eclipse system and the remote host computer communicate using leased or switched synchronous lines, supporting data communications speeds up to 9,600 bit/-sec. Adding a Data Control Unit/200 allows support of transmission speeds up to 56K bit/sec.

The initial software license fee with support services for the AOS RCX70 emulation software is $8,000, with subsequent support services available for $5,000.

Support services include one year of the Software Subscription Service, a copy of the software and complete documentation and installation.

The emulation software requires at least 256K bytes of main memory and an SLM series multiplexer capable of handling two synchronous lines.

DG is at Rt. 9, Westboro, Mass. 01581.

X.25 Protocol Tester Serves as Simulator

MARINA DEL RAY, Calif. — Users and developers of X.25 software and hardware may soon be able to use a transportable, multipurpose tester to aid in development and debugging.

The Tran Telecommunications Corp. XPRT diagnostic tool is an intelligent unit that can serve as a network terminal simulator, a line monitor and a protocol validator.

The stand-alone tester supports multiple line speeds with a complete hardware/software package. Interactive control via Tran's video or teletypewriter also is featured.

Tests at X.25 Levels

Using microprocessor-based technology, XPRT tests X.25 data terminal equipment and networks at electrical, link control and data packet X.25 levels. The unit generates, displays and validates X.25 traffic, Tran said.

Equipment to be tested can be connected locally or remotely regardless of the data rate, the vendor added.

In the simulator mode, XPRT's functions include user-specified or automatic frame generation, user-selectable frame display and validation, packet generation of major and minor error conditions, error condition reporting and hexidecimal or octal notation.

Line monitor functions include loop-back testing and selective display of traffic over the line. XPRT costs $15,000. September deliveries are set.

Tran Telecommunications is at 2500 Walnut Ave., Marina Del Ray, Calif. 90291.

Tymnet X.25 Net Fits Tandem Host

CUPERTINO, Calif. — Tymnet, Inc. has released an X.25 protocol-supported public packet network to interface with Tandem Computers, Inc. host CPUs.

The network will interface with the Tandem Axcess software package, Tymnet said, which was designed to support the X.25 protocol for Tandem's Nonstop CPU.

Tymnet is at 20665 Valley Green Drive, Cupertino, Calif. 95014.

Switching Systems Do Two Jobs

(Continued from Page 59)

Assembler/Dissembler functions for synchronous and asynchronous terminals.

Interexchange packet transfer between nodes within an EDX packet network and to other packet networks follows CCITT X.75 procedures, the company said.

As a packet network, throughput is quoted at up to 1,000 packet/sec. As a message switch, the EDX hardware and software structure allows the system to fulfill a wide range of applications from small private exchanges (PABX) to large public message-switching centers, the firm claimed. It reportedly can be adapted to fulfill military network requirements.

All common hardware units are redundant, employing a "hot-stand-by" backup. Disk and tape storage is connected to both CPUs by programmable switches. Several times a second, the current status stored in the dynamic field is ledgered onto both disk systems, making data available both in the on-line CPU and on disk.

Since system pricing is entirely dependent on the intended uses, the company was unable to give a representative price range for the EDX.

Siemens is at 186 Wood Ave. S., Iselin, N.J. 08830.

Emulators Offered for DG Eclipses

(Continued from Page 59)

put queue and I/O procedures, the company said.

The TPS allows up to 39 CRT stations to run simultaneously. It also allows real-time processing with batch data collection and on-line data entry to a host computer.

Other features include multiterminal program development concurrent with data entry, supervisory control over multiterminal program development and user password file and interterminal communications.

Combination System

The combination system provides all the features of the two systems already discussed as well as others.

In the DCS mode, for example, an operator can switch to TPS mode or 3270 mode with one keystroke and save the most recent 3277 screen format for redisplay upon reentry to the 3270 mode. In the TPS mode, the operator can perform those functions listed for the DCS mode, switching instead from TPS to DCS in one keystroke.

The 3270 software incorporates unique features, DCC said. A few of these are the provision for batch transmissions within the 3270 protocol framework by use of dummy terminals, emulation of IBM 3271, Model 2, 3274 Model 2 and 3276 Model 2 controllers and support of more than 32 logical terminals in any mix of CRT, line printer and/or dummy terminals.

The DCS costs less than $15,000, while the TPS is available for less than $20,000. The combination system costs less than $30,000 from the Minicomputer Division of Data Communications at 3000 Directors Row, Memphis, Tenn. 38131.

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For Multidrop Nets
Terminal Links to Burroughs CPU

CORNWELLS HEIGHTS, Pa. — A microprogrammed CRT terminal for multidrop communication networks interfacing with Burroughs Corp. CPUs is available from Delta Data Systems Corp.

The Delta 2830 emulates Burroughs TD830 CRT terminals including multiple page operation, forms mode, tabulation, screen operation format function, editing functions and highlighting schemes.

A teletypewriter mode is standard on the 2830. Activated by a keyboard sequence, communication links can be established with a compatible CPU.

The 2830 has a 15-in. CRT screen with a 7 by 9 character matrix. The display is organized in a 28 line by 80 character format, with 24 lines reserved for data and the balance for special messages, error conditions and terminal status reports.

Optional equipment on the 2830 includes line monitoring capability, start-up and troubleshooting, a Delta spokesman said. A print select operation will generate hard copy without locking up the terminal. Print output is reportedly provided via a serial printer port.

The 2830 incorporates 1,400 bits of electronically alterable read-only memory (Earom), a special memory for software-controlled options from the keyboard that retains settings if power is lost.

The Delta 2830 costs $2,500 from Delta at Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

RJE Terminal System Built for Univac 1100

BELTSVILLE, Md. — A remote job entry (RJE) terminal system for Univac 1100 series users is available from RDA, Inc.

The RD11-U emulates the Univac 1004 RJE, communicating synchronously at speeds up to 9,600 bit/sec. It can support paper and magnetic tape, floppy disks, card readers, cartridge disks, printers, CRTs and graphics plotters.

The RD11-U is driven by the Digital Equipment Corp. LSI-11 MPU and is compatible with the DEC RT11 and RSX11M systems, RDA said. Languages include macro assembler, Fortran IV, multiuser Basic, APL, Focal and Pascal.

A typical system using 64K bytes of random-access memory, extended arithmetic, programmable dual-density floppy disk, 180 char./sec printer, CRT, synchronous communications interface, RT11 and the Univac 1004 software is priced at $17,950. On a three-year lease, the monthly cost is $630.

With a 1M-byte cartridge disk, the system costs $20,950 or $735/mo on a three-year lease.

RDA is at 5012 Herzel Place, Beltsville, Md. 20705.

Portable Terminal Allows Storage Up to 5,000 Char.

WHITE PLAINS, N.Y. — Teleram Communications Corp. has announced the P-888, a portable terminal with a 7-in. CRT and typewriter-style keyboard.

The screen displays 890 characters in 17 lines of 52 characters, and text is continuously scrollable or can be keyed to the beginning or end of the text. The unit stores up to 5,000 characters in a volatile mirrored microprocessor memory, Teleram said.

Text can be moved onto an on-board Ansi data cassette, which stores 44 blocks of 5,000 characters each and can transmit at low (300 bit/sec) or high (1,200 bit/sec) speed while the operator continues to type on the terminal, a spokesman noted.

With the introduction of microprocessor memory in this model, Teleram said it is now possible to move sections of type around, make deletions, search for and replace words or strings of words (automatically or manually) and block transmission automatically.

The P-888 comes with the Ascii character set, but can be ordered optionally with other sets. The unit costs $5,495 from Teleram, 2 Corporate Park Drive, White Plains, N.Y. 10604.

Data Link Test Set Bows

FORT WASHINGTON, Pa. — A data transmission test set with a bit rate extending to 22M bit/sec has been introduced by Aydin Monitor Systems for implementing and testing digital data links.

The Model 604M generates various blocks of data that are transmitted and received over a data link and then compared. Applications include common carrier lines, satellite communications and hardware off-line testing, Aydin said.

The unit monitors and displays bit errors, bit error rates, number of errors per second and test duration in terms of either the total number of blocks or the total number of seconds.

Self-test, including clock and data loopback, insert error and slip sync, is featured on the 604M.

Outputs are provided for external counters and recorders and a parallel BCD 10-col printer interface for direct bit error rate and alarm printout, the company said. All test points, read-outs and controls are located on the front panel.

The 604M costs $6,250 from Aydin Monitor Systems, 401 Commerce Drive, Fort Washington, Pa. 13094.

'Soldering Iron.'

Identikey Option Supports Olivetti Teller Terminals

NEW YORK — Olivetti Corp. of America's TC800 teller terminals have gained Identikey — developed by Atalla Technovations of Sunnyvale, Calif. — for positive customer identification.

With TC800 terminals configured with customer badge readers and Identikey, signature card reference files or microfiche files do not have to be scanned; officers' approvals or interbranch telephone calls are also eliminated, Olivetti said.

Once a personal identification code is entered by a customer at the branch bank window and the customer badge is read by the badge reader, the two inputs are processed through the Identikey algorithm, allowing the bank to generate positive customer identification.

The total system was designed to eliminate fraudulent use of the terminals and reduce transaction time.

The Identikey option costs $1,475; the TC800 costs about $8,000 in a typical configuration, a spokesman said.

Olivetti is located at 500 Park Ave., New York, N.Y. 10022.

Avanti Eases Fast Transfers

NEWPORT, R.I. — A high-speed data transfer system designed for computer-to-computer bulk data transfer or satellite communications between earth stations and user locations is being offered by Avanti Communications Corp.

The Avanti 2300 reportedly operates at data rates of 1.544M- or 3.088 M bit/sec over unloaded twisted pairs of coaxial cables at distances up to 7,000 ft.

The $2,750 Avanti 2300 is available from Aquidneck Industrial Park, Newport, R.I. 02840.

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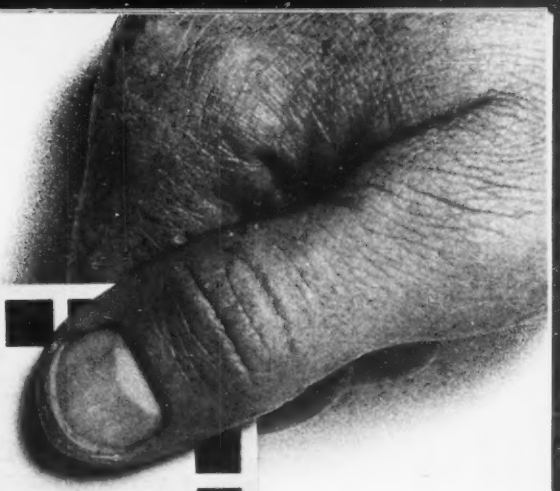

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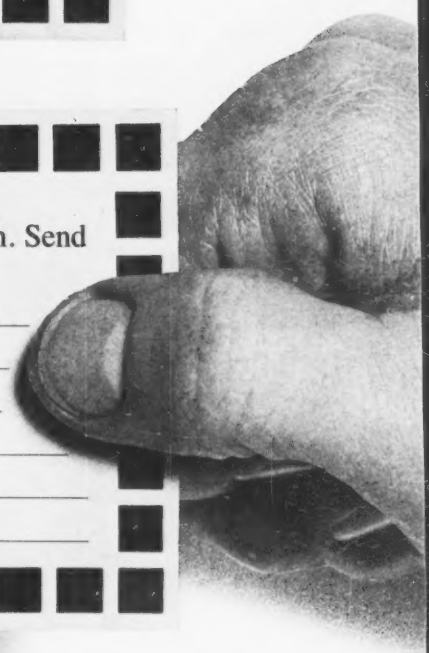

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Unit Generates Test Patterns

CHELMSFORD, Mass. — Tau-Tron, Inc. has introduced the MG-502 data generator, which provides a programmable high-frequency digital test pattern for a wide variety of test applications.

The format is selectable for either nonreturn-to-zero or return-to-zero serial data output, and output worked length is variable at 16, 32, 64, 128 or 256 bits, Tau-Tron said. The generator's logic is driven by an output baseline offset control.

The MG-502, a half-size module in the company's modular instrument line, costs $4,730. Tau-Tron is at 27 Industrial Ave., Chelmsford, Mass.

Interdata CPUs Get Four-Channel Link

ANAHEIM, Calif. — Macrolink has introduced a plug-in four-channel interface board called Qalta to directly replace the single-channel adapter in Perkin-Elmer Corp. Interdata processors.

The interface is said to conserve plug-in space within the processor, allowing more interfaces to be used before it is necessary to install a Palms add-on chassis.

The single Walf-board supports operating rates from 50- to 19.2K bit/sec and plugs into any available slot in the CPU, a spokesman noted.

The asynchronous communications interface is fully compatible with Interdata's Pasla/Palms communications products, as well as with the host computer's operating system and diagnostic software. It can be tested through the serial data section of the Interdata Palms test, according to the spokesman.

Selection of 10-bit address fields and bit rates is accomplished through switches instead of jumpers. Two control lines are provided for each channel interface as well as transmit and receive lines.

The Qalta is furnished with an internal cable that is pin-compatible with the unit it replaces. It is priced at $675 from Macrolink, 1740-E S. Anaheim Blvd., Anaheim, Calif. 92805.

For Serial Transmission

Interface Unit Fits Micros

ANAHEIM, Calif. — An asynchronous communications interface adapter that provides 8-bit microprocessor-based systems with a universal asynchronous receiver transmitter (Uart) interface for serial communications is available from Rockwell International.

The R66551 is a member of the R6500 microprocessor series and is intended to link 6500- and 6800-based micros to terminals, data sets and modems.

The device requires only an accessory crystal to transmit at any of 15 program-selectable rates from 50- to 19.2K bit/sec, or at one-sixteenth the rate of an external clock input. It can be programmed to receive at the selected transmitter rate or at the receiver clock rate, Rockwell said.

Additional features include a program-selectable transmitter echo mode for full-duplex communications.

The R66551 comes in plastic and ceramic 28-pin dual-in-line packages.

It costs $12.25 for a 1 MHz device and $13.50 for a 2 MHz device from Rockwell International's Electronic Devices Division, 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Seminar Slated In Three Cities

ANNAPOLIS, Md. — A two-day seminar for telecommunications systems managers is being offered by Arnic Research Corp. in Washington, D.C. this month, New York in September and Los Angeles in October.

The seminars will focus on the effects of changing regulatory and tariff environments on telecommunication system planning. Panelists representing government, industry and suppliers will discuss the problems of planning and managing a telecommunications system.

The seminar will be offered June 26-27 at the Washington, D.C., Sheraton Park Hotel and Wardman Towers, Sept. 10-11 at the Barbizon Plaza Hotel in New York City and Oct. 15-16 at the Los Angeles Marriott Hotel.

Registration costs $395. More information is available from the Educational Programs Office, Arnic Research Corp., 2551 Riva Road, Annapolis, Md. 21401.

Supermux 480 Users Offered ABR Option

CHERRY HILL, N.J. — Owners of Infotron Systems Corp. Supermux 480 statistical multiplexers can now add automatic baudy recognition (ABR) to their systems.

The ABR capability permits units to recognize the speed of dial-up inputs operating at 110-, 134.5-, 150-, 300-, 600- and 1,200 bit/sec using a carriage return or a Memorex Corp. convention.

The ABR option costs $400. The Supermux 480 comes as a four-channel unit for $1,500 and an eight-channel version costing $2,500.

Infotron is at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Small Business Systems Surveyed

Microdata Reality Gets Top User Rating

Microdata Corp.'s Reality, Basic/Four Corp.'s Model 400 and the IBM System/3 models 6, 10 and 15 reaped the highest marks in Management Information Corp.'s (MIC) fourth annual small business systems users survey.

To assess how well small business systems are meeting users' needs, MIC polled 568 companies that use 689 small business CPU's.

Each respondent was asked to subjectively rate the vendors and their products on performance (whether stated equipment specifications have been realized), reliability (uptime vs. downtime), ease of use (amount of time necessary to train new personnel), service (maintenance) and vendor support (such as advance training and program assistance).

A four-point rating scheme was used (1 = poor, 2 = fair, 3 = good, 4 = excellent). The survey results were given as averages of the ratings assigned to each product in each of the five categories.

The Microdata Reality, Basic/Four 400 and System/3 Model 10 and Model 15 were the only small business systems to receive ratings of 3.0 or higher in all five categories.

Taking the average of all five categories, the Microdata Reality topped the field with a score of 3.66 (based on 27 respondents using 55 units). The Reality earned 3.8 in performance, 3.8 in reliability, 4.0 in ease of use, 3.4 in service and 3.3 in support.

Based on nine respondents with nine units, the average for the IBM System/3 Model 15 was 3.6. This system was rated 3.6, 3.8, 3.6, 3.7 and 3.3 in performance, reliability, ease of use, service and support, respectively.

Eight users with 17 Basic/Four 400's gave that system an overall rating of 3.5. In performance, reliability, ease of use, service and support, the system was rated 3.5, 3.4, 3.8, 3.4 and 3.4.

Following this order, the IBM System/3 Model 10 was rated 3.3, 3.5, 3.3, 3.3, and 3.3, respectively, by 34 users with 45 units. The System/3 Model 6 received 3.4, 3.7, 3.7 and 3.1 ratings in performance, reliability, service and support, respectively, by eight users with eight units.

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A recent MIC survey published in Computerworld asked small business computer system users to evaluate their equipment.

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Harris 1600 System Gets IBM 3741, 5230 Emulation

DALLAS — Harris Corp.'s Data Communications Division has announced the addition of IBM 3741 and 5230 emulators to the 1600 family of distributed data processing (DDP) systems.

With the 3741 emulator, a 1600 system can emulate both an IBM host computer receiving 3741-formatted data files and an IBM 3741 data entry/-transmission device such as the Model 2 data station or the Model 4 programmable workstation, Harris said.

The emulator can also serve as a preprocessor or concentrator by spooling data files to disk from an IBM 3740 data entry system at speeds of 2,000- or 2,400 bit/sec.

After the files have been processed with user-written Harris Regal or Cobol programs, the data can be transmitted to a host processor at speeds up to 19.2K bit/sec, a spokesman said. The receiving mainframe can be any System/3, System/32, 360, 370 or 30 series machine.

The 5320 emulator enables Harris's 1600 DDP system to emulate the transmission capabilities of IBM's 5321 controller used in the IBM 5230 data collection system, utilizing 3741 protocol. The emulator also allows the 1600 to be used in factory operations for data collection applications.

The 1600 can receive data from an IBM 5321 controller when it serves as a concentrator for an IBM 5320 system in place of a 5234 or 5235 shop floor collection device, he claimed.

The emulators are available as a standard feature on all Harris 1600 systems and can be retrofitted to existing 1600 systems without charge. Harris is located at 16001 Dallas Parkway, Dallas, Texas 75240.

Managers Set October Meeting

PORT CHESTER, N.Y. — The Communications Managers Association (CMA) will hold its third annual conference and exhibition Oct. 16-18 here at the Rye Town Hilton.

The conference theme will be "Telecommunications 1980 — The Electronic Connection." Participation in the conference is open to anyone with the communications responsibility for their company but not employed by common carriers, equipment suppliers or communications consultants.

Fees are $90 for CMA members or members of any other telecommunications management organization and $140 for nonmembers.

Communications vendors interested in exhibiting their products and services can contact Frank Masters, Trade Associates, Inc., 5454 Wisconsin Ave., Washington, D.C. 2000.

Further information on the conference is available from Charles Schweis, Ciba-Geigy Corp., 444 Saw Mill River Road, Ardsley, N.Y. 10502.

McCarthy to Head New England Group

BOSTON — The New England Telecommunications Association has announced its slate of 1979-80 officers.

Henry M. McCarthy, telecommunications director for the John Hancock Mutual Life Insurance Co., was elected chairman of the association, which reportedly has more than 100 member organizations.

Boston Gas Co.'s Thomas M. Flanagan became vice-chairman and Analog Devices, Inc.'s Susan M. Savino was named secretary.

Founded in 1961, the association is intended to improve the expertise of New England telecommunications management. McCarthy can be contacted at John Hancock Mutual Life, John Hancock Place, P.O. Box 111, Boston, Mass. 02117.

'Computers in Communications' Set as Conference Theme

LOS ANGELES — A conference on "Computers in Communications" will be held in Los Angeles at the Hyatt Los Angeles International Hotel on June 25-26.

The conference is jointly sponsored by the American Institute of Aeronautics and Astronautics (AIAA), the Data Processing Management Association and the Technology Transfer Society.

Gen. Alton D. Slay, commander of the Air Force Systems Command, will deliver the keynote address: "Command, Control and Communications — What Are the Problems, Latest Solutions and Future Challenges?"

Dr. Robert K. Roney, assistant group executive and vice-president of Hughes Aircraft Co.'s Space Communications Group, will discuss "Satellite Communications — Identifying the State of the Art in Communications."

The conference costs $345 per registrant or $325 for members of the sponsoring groups. Teams of three or more are admitted for $285 each and government and university personnel can register for $245.

Further information is available from AIAA Conferences, 5959 W. Century Blvd., Los Angeles Calif. 90009.

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The power of virtual memory.
The new Prime 450 System Builder provides each of as many as 32 simultaneous users up to 32 million bytes of virtual address space – space that can be addressed quickly and directly, just as if it were in main memory.

For developers of big, complex software systems who could previously offer their systems only on mainframes, this virtual memory capability means the 450 can run even the biggest programs at a dramatic cost reduction. And for developers of distributed processing networks, it means big-system power where it's needed, at a remarkably low cost.

At minicomputer prices.
Until now, a virtual memory computer with anything even approaching the power of the 450 is likely to have carried a price tag well over $100,000. The quantity-one price for the Prime 450, with built-in 32-million-byte disk (expandable to 96 million bytes), 256K bytes of high-speed main memory (expandable to one million bytes), and a 2K-byte, 80-nanosecond cache memory, is $65,000. A quantity discount schedule that starts high and moves fast cuts that by 45% at 25 systems, for a full-discount unit cost of $35,000.

To make this pricing possible, we build the 450 in high volume, in a standard configuration. We can deliver quickly, and the system developer can hand his 450-based system over to the end user programmed and ready to go.

In a compatible family of computers.
The Prime 450 is a fully compatible, execute-only computer system. Because no one at the user site can modify the program, downtime and maintenance costs can be substantially reduced.

The 450 runs the same PRIMOS® operating system and uses the same peripheral devices as the other members of the Prime family. Applications software for the 450 can be written on any other Prime system in COBOL, FORTRAN, BASIC, PL/I, and RPGII. And the 450 can be built into distributed processing networks that utilize Prime's extensive communications software, including X25 networking, RJE emulators, and IBM 3270 support.

If you ever outgrow the 450, you can upgrade simply and economically, and all your software will run on the bigger Prime, without reprogramming. We guarantee that in writing.

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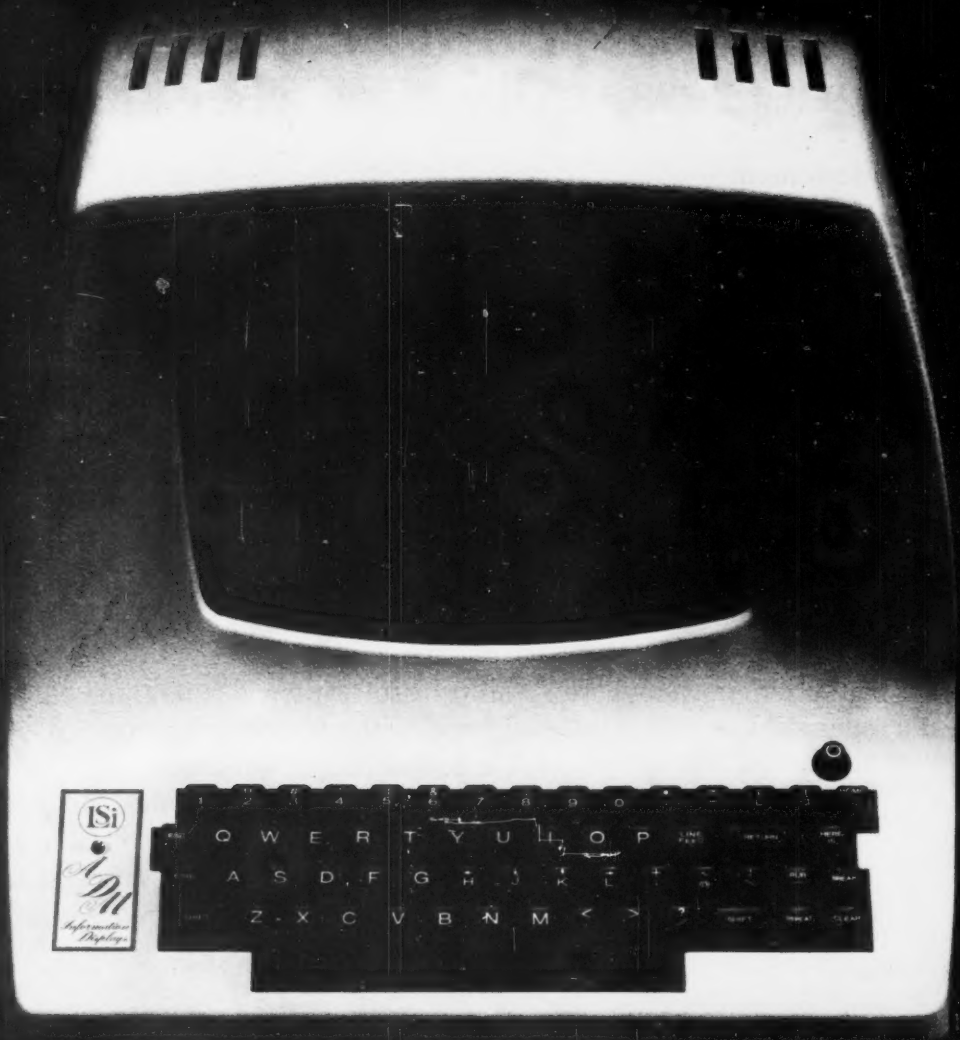

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Could Pass for a Hotel Room

Automation Gives Bank Office New Look

By Howard A. Karten
CW Staff

CHICAGO — Although it is a business office in a major bank, it doesn't look much different from a well-appointed hotel room. There is ample seating room, but no desk, pencil, paper, in-basket or file cabinet.

In fact, only the terminal keyboard and the large projection television system look out of place. They were installed to turn this office into a part-time conference room.

It may well be the prototype of the office of the future.

"If you evaluate [the business environment] carefully, you find that most decision-makers are still untouched by any sort of automation," the office's owner, Louis Mertes, said.

"Most people feel they're automated if they get a piece of paper that came off a computer, and they feel that they should have more automation, no matter how much they've got."

Mertes is vice-president and general manager of systems at Continental Illinois Bank and Trust Co. of Chicago. Although his office is impressive, it is a working office, not a showplace.

Bringing It Home

Mertes' office isn't the only "automated office" the bank maintains. Terminals are evident in other offices and have been installed in the homes of 15 to 20 of the bank's senior managers.

And, in what may be the beginning of a trend in the labor market, terminals for receiving dictation and for word processing have been installed in the homes of a number of women employees who, for one reason or another, are tied to their homes. The arrangement is working out well for both the bank and the employees, Mertes said.

The at-home word processing, the widespread use of terminals — currently there are about 600 authorized users — and a rapidly growing electronic mail system within the bank are part of Mertes' drive to provide employees and customers with "full function and mobility."

"The whole thrust of what we're trying to accomplish is getting the primary, 'bread and butter' applications such as charge card and check processing up to current [hardware] capabilities, while bringing [the systems] to bear for the people who need them," Mertes said in a recent interview. Those in need include the professionals, the staff support people, the sales force and management, he noted.

"We're trying to get a blend of effort, so we can keep on moving and getting these key applications done and upgraded, so they can maximize the use of the current technology, at the same time providing accessibility of information for decision makers. They then can do their jobs better and become more productive," Mertes said.

The hardware backing up this effort is impressive: an 8M-byte

(Continued on Page 76)

Dual-Bus Array Processor Unveiled For Number-Crunching Applications

BURLINGTON, Mass. — An array processor introduced by CSP, Inc. is a 64-bit-wide, dual-bus system that reportedly can speed up processing in applications requiring large amounts of number crunching.

The device — which can be attached to mainframes, superminis or minicomputers — signals the company's intention to compete in the arena now occupied almost exclusively by Floating Point Systems, Inc. (with its array processor) and Minnesota's Cray Research, Inc. and Control Data Corp. (with their number-cruncher systems).

Although array processors are commonly considered useful only in esoteric, laboratory-oriented DP, CSP officials emphasized that they would not be limited to that market with the $89,000 device. The device can be applied to scientific tasks, such as weather modeling and high energy physics; engineering applications, such as optics design and structural analysis; and tasks in operations research, such as econometrics, supply/-demand scheduling and resources allocation.

The MAP-6400's Capabilities

The system, designated the MAP-6400, speeds processing on a host system by attaching to the host and performing a limited range of operations — chiefly calculations — faster than the host, officials said. The device attaches to the host via an I/O channel, and it works logically by performing calculations itself so the host doesn't have to perform Fortran routines.

(Continued on Page 72)

How to Cut COM Costs

In a technological version of the ribbon-cutting ritual, Richard L. McCall, president of U.S. Datacorp, cuts a long strip of computer output microfilm containing one million records in a recent dedication ceremony for the company's $1 million national headquarters.

With BEALL Directing, Your Computers Never Miss a Beat

The Beall Channel Switch. Lets you direct critical on-line services to another CPU at the flick of a switch when failure occurs. Allows specific peripherals serve more than one computer. Redrives all CPU signals to give you far more flexibility for physical placement of peripherals.

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Xerox Printer Gets Options

EL SEGUNDO, Calif. — Two optional upgrades for the Xerox Corp. 9700 electronic printer are aimed at improving the usefulness and capability of that system, according to the company.

A duplex version of the system, capable of printing sequentially on both sides of a sheet of paper, costs $27,000 and is scheduled for December delivery.

Operating directly from a computer or from magnetic tape, the system features a wide choice of type styles and sizes, a spokesman said, and is intended typically for company financial and personnel reports, price lists, catalogs and manuals.

The option adds $650/mo to the basic rental price of $9,500/mo.

A second option announced by the company interfaces the 9700 to the Xerox 850 word processing line. With that option, scheduled for October delivery, the output of the word processing system is stored on a disk within the 9700 for later processing. The text material is stored by the 9700 operator at the desired time.

The $3,200 option permits communications with the printer either directly or over lines at a speed of 300 char./sec. The interface adds $100/mo to the basic rental fee.

Xerox can be reached at 701 S. Aviation Blvd., El Segundo, Calif. 90245.

Itel Memory Gives Boost To IBM 370s, Series 30

SAN FRANCISCO — Itel Corp. has introduced a universal main memory for users of IBM 370 or Series 30 CPUs. The memory, available in 1M-byte increments, permits users to add memory to their systems beyond the limits specified by IBM.

The memory for the 370 models 138, 148, 158, 168 and all three Series 30 systems uses 16K-bit, pluggable-chip technology and is said to extend the economic life span of those IBM systems, which many users fear will be eclipsed by recent and expected IBM product announcements.

The Itel universal memory operates at the same access speeds and level of interleaving as the host CPU and is field-installable, a spokesman said. The memory uses fewer component parts than IBM-supplied memory, the firm said.

Preventive 'Medicine'

Other features of the memory include an on-line performance monitor that reportedly enables correction of potential failures before they occur and an Address Relocation feature that can be used to reconfigure memory and permit temporary deferment of failing memory repair.

In addition, a power status control panel enables monitoring of power supplies for maintenance of potential failures before they occur, and an error-checking and correction display enables field engineers to monitor system failures and pinpoint the precise failing address and bit.

The memory, packaged in a single unit, is being shipped now and costs $400,000 for 8M bytes or $700,000 for 16M bytes. The cost of lower amounts of memory were not available at press time.

Itel can be reached at One Embarcadero Center, San Francisco, Calif. 94111.

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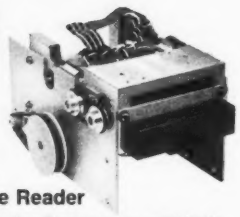
Model 6111 Automatic Card Reader — The new 600 CPM reader is dustproof, dependable, and ultra quiet. The advanced designs of the 6111 make it almost maintenance free.



Card/Badge Reader

PDI's Card/Badge Reader can read both standard tab cards and Type 3 plastic badges on an intermixed basis. Unsurpassed in field performance, the Card/Badge Reader has become an integral part of factory data handling applications.

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Array Processor Speeds Big Jobs

(Continued from Page 71)

CSP said the device, as a logical outgrowth of the company's other products, the MAP-200 and the MAP-300, would be the beta-test at user sites through December, with first shipment of production units beginning in January 1980.

Data gathered by the company is said to show that the MAP-6400 can do a 100-by-100 matrix multiplication in one second compared with .04 sec on the CDC Star 100 and .015 sec on the Cray-1 system. Figures derived by CSP from this data indicated that the MAP-6400 performs 11 operation/-sec/dollar vs. 9 for the Cray-1 and 3 for the Star 100.

The IBM 370/168, by contrast, performs the matrix multiplication in 1.8 sec, but at a rate of .13 operation/sec/-dollar, the company claimed.

The MAP-6400 is fully software-compatible with the MAP-200 and MAP-300, CSP said, and has its own operating system and executive processor.

Other specifications for the system include 16K bytes of 500 nsec program memory and 32K bytes (by 64 bits) of 500 nsec data memory, officials said from CSP at 209 Middlesex Tnpk., Burlington, Mass. 01803.

'It's Electronic Mail.'

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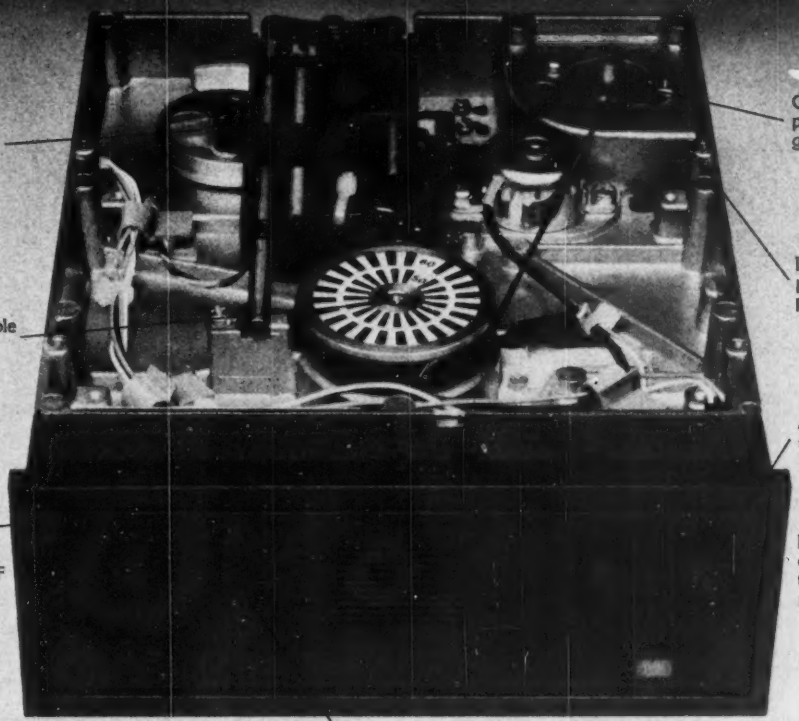

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For Testing, Inventory Uses

OMR Systems Offer Time, Accuracy Benefits

By Joseph C. Bessler
Special to CW

Most of us remember taking machine-scorable tests in school. Responses were marked on a piece of paper or card with a special pencil, translated by an optical mark reader (OMR) into specific numbers or letters and then entered into the CPU.

OMR systems have a number of advantages over other types of data entry, particularly where time and accuracy are important. For instance, OMR forms may be preprinted with information and linked to the computer file via a sheet serial number. Inventory part numbers and names can be printed on forms beforehand so that an operator doesn't have to re-enter data that is standard to the operation.

Versatility is another advantage of OMRs. Not only do all models produce one record per sheet read, but some can also read multiple sheets, combine them in the proper order and output a single record. This capability is excellent for booklet processing of tests, questionnaires and surveys and for many other applications.

Throughput Rate

At Bessler Educational Systems & Technology, an OMR service bureau, we use a National Computer Systems Sentry 7008 machine that reads both sides of 8-1/2-in. by 11-in. sheets at the rate of 3,000 sheets per hour. Each sheet has a maximum of 2,961 response positions. Even if only 300 characters are read from the available response positions, the rate of throughput is very favorable when compared with other data entry methods such as key systems.

However, for any user, the main question is whether OMR can solve its particular data entry problem.

OMR systems range from very small to very large models in both on-line and off-line versions. Consequently, prices start at around $3,000 to $15,000 and peak at approximately $350,000. The main differences in these models are speed and ease and versatility of programming. Efficiency and dependability must be considered along with price.

Best for Whom?

Following are some questions for users thinking about OMR:

• First of all, does the person entering the data on the sheet have immediate access to another method of data entry?

A student taking a test, an employee filling out a questionnaire, a clerk taking inventory, a delivery driver on a truck and a job applicant filling out an application are all far removed from any other method of data entry such as an optical character typewriter and must enter data by hand onto a sheet that later must be keyed onto a computer-acceptable medium. These applications are excellent candidates for OMR.

• Second, is time a problem?

OMRs are excellent when turnaround time on data is critical. A clerk can take inventory in the morning and turn in the sheets in the afternoon. The OMR can then read them and input the data to the computer so that the trucks can be loaded at night and the shelves stocked the next morning.

Data Volume

• Third, is data volume high?

Consider the application just described. It may be difficult, but manageable, to key the data for one store, but what if a company has more than one store? The volume of data now becomes burdensome and the speed of the OMR a great asset.

• Fourth, does the data have to be verified?

Verifying data doubles the keying cost in many cases. Because OMRs do not have this human element, a separate verifying operation is not needed.

• Fifth, are data entry costs high?

OMR systems are usually much cheaper per character entered because of the higher speeds of entry and lower personnel costs.

Peaks and Valleys?

And finally, are there severe peaks and valleys in data volume? It is very expensive to keep keypunch personnel on hand for peak periods. One cannot always go to a keypunch service bureau and get the turnaround one requires for peak-load processing.

The capabilities of the OMR can allow planning for peak loads at the best financial level for an individual firm.

What are the disadvantages of OMR? Its main strength is also its main disadvantage. Each character to be entered must be represented by a mark in the appropriate place on the sheet. It takes time to fill out the sheets.

Therefore, unless the individual has to first enter the data on a sheet and then have it transferred, an OMR system may not be a company's best alternative.

If a company's needs meet the criteria of the first question above and a company can answer "yes" to any of the other questions, it should seriously consider OMR as a viable option.

Bessler is an OMR consultant and president of Bessler Educational Systems 7 Technology in San Diego.

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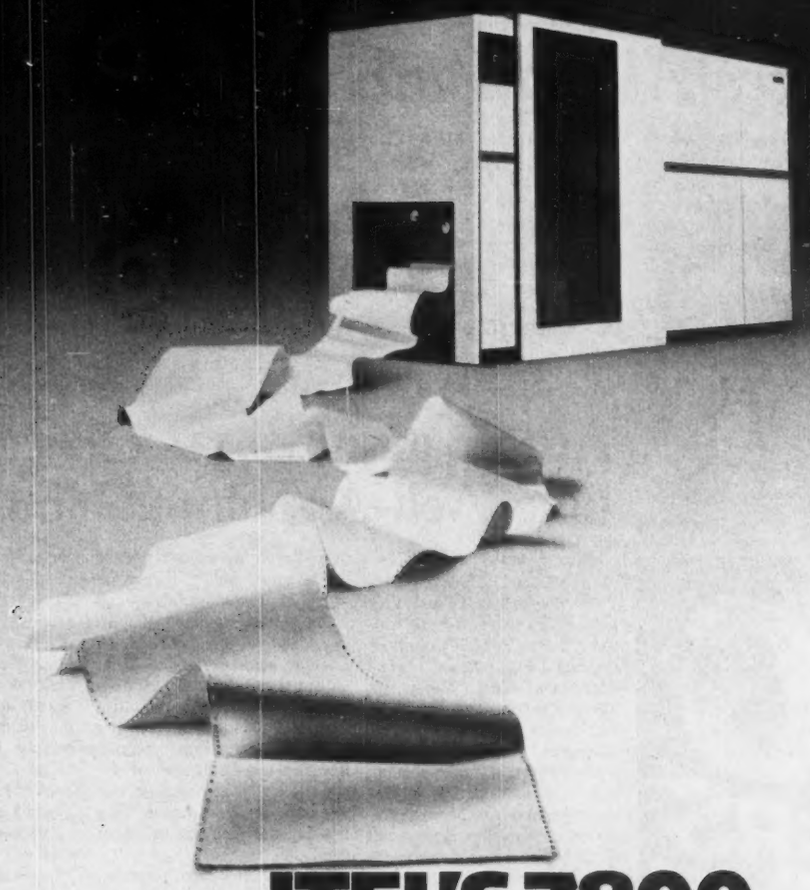

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Bank Forges Ahead With Electronic Mail

By Howard A. Karten
CW Staff

CHICAGO — Under the direction of Louis Mertes, a vice-president of the Continental Illinois Bank and Trust Co. here, the bank is forging ahead with its electronic mail system, which currently has approximately 250 users.

Under this system, a manager can write a memo on a terminal and then "mail" it electronically to one or more destinations. The memos are stored on the system, which then serves as an "electronic filing cabinet."

Using terminals, the memos can be accessed — and answered — from virtually anywhere in the world. The system can also store other kinds of written information, freeing its users from dependence on internal mail services.

Several studies indicate that as much as 60% to 70% of a manager's mail originates internally, according to Mertes, who claimed that the cost of physically creating, sending and distributing a document using his electronic mail system is well under $1.

The system yields other benefits in addition to helping to reduce costs, Mertes explained. For example, he keeps much of the data he needs — files, lists, memos and so on — on the system. His secretary keeps his list of appointments on the system as well, which means that an appointment never shows up on one calendar without appearing on another.

The problems associated with filing material are also eliminated; it is easier to browse through the list of files and items on the system then it is to look in a physical file for a specific piece of paper.

Mertes keeps his tickler file on the system. "As you use that automated capability, you become more deadly on your follow-up and forget less," he noted. The system has enabled Mertes and Karl Peter, operations manager for the bank, to reduce the number of secretaries and administrative aides. "I have gone from three aide/-secretaries down to one, who primarily does the things the system can't do," Peter noted.

The system currently generates about 5,000 memos a week, and more and more potential users are coming on board as their bosses, subordinates and peers begin to use it, Mertes noted.

Automation Makes Office Look Like Well-Appointed Hotel Room

(Continued from Page 71)

IBM 370/168, a pair of 8M-byte 370/168 Attached Processors and an 8M-byte Amdahl Corp. 470V/7 complemented by a pair of Digital Equipment Corp. Decsystem 10 processors that run the bank's time-sharing network.

Despite — or perhaps because of — this impressive array of hardware, the equipment is not one of Mertes' major concerns. "If you store all the information in one library, you can access it through a phone line; you can organize your business to interact with the marketplace; and the technology doesn't become a critical path.

"Conceptually, it's no different from having distributed data bases that can talk to each other. However, you can accomplish this now with existing hardware and software, and it somehow seems technically easier" than using localized hardware that communicates with remote hardware, Mertes explained.

Measuring Effectiveness

Given that the necessary technology exists now, in a usable form, the most important aspects of the system have become, predictably, the human factors and managerial issues. "All systems managers have been directed to study what jobs could be done at home so, for example, we can cut down on energy consumption," Karl Peter, manager of systems operations, said.

"But the issue really is, how do you monitor and control usage? How do you measure effectiveness? Some points, such as the discussion of design issues in a program, obviously require face-to-face contact between the user and analyst."

To illustrate Peter's point, Mertes cited three human factors that are involved, related to managers using keyboard devices. They were traditionally viewed as tools for lower level employees because managers do not know how to use them, and the introduction of the devices represents change, which makes all people uneasy.

"The learning process is a lot slower than we guessed initially," Mertes admitted, "but people do acclimate and start using keyboards."

Managers need 15 to 30 hours to learn how to use the system. Mertes initially thought it could be accomplished in three to four hours. He likened the training staff to a group of IBM salesmen.

"They have to teach, educate, help and hang around a territory trying to get people familiar with the system. Their job is to get people comfortable with the system and find out what our service lacks," he said.

Mertes and Peter had high praise for the bank's senior management, which is fully behind these pioneering efforts. "It's a top-down process. When you automate the payroll process, people have no choice but to use it," Peter said.

But with an electronic message system, for example (see related story on Page 76), people can still elect to use paper for memos, he noted. "We have been able to achieve our results because the president and chairman of the board are actively pushing this program; they've been very supportive of our efforts," Peter commented.

"This costs money and may not always work out. Therefore, the key thing is to be aware of how to experiment and bring the risk down to a manageable proportion," he said.

"If you are effective at managing the resources you have and can deliver to the company a reduced operating expense, you can 'build in' risk, and it's [much less of a] risk then," Peter noted.

Printer Offers 256 Character Sizes

FRAMINGHAM, Mass. — The Intacs 2310 printer unveiled by Dennison Manufacturing Co. offers variable character size and multidirectional imprinting on stock forms up to 13 in. wide. The device, operating at 140 char./sec, features interfaces for IBM 3270, serial asynchronous, 8-bit parallel protocols and others.

The unit can vary individual character sizes from .05 in. to 1.6 in. in height and width for a total of 256 variations. The device prints both horizontally and vertically, and intelligence built into the device can increment and decrement up to four different serial numbers on each document.

Using the standard 96-char. Ascii font, the unit can print multiple-sized characters on the same line in both upper and lower case, a spokesman said. By using down-line loading and the unit's intelligence, some of the printing burden reportedly can be removed from the mainframe.

The $6,995 unit provides complete control over horizontal and vertical tabbing and positioning and character spacing. Both standard pin-feed forms and non-pin-feed forms can be accommodated with the dot-matrix unit, the company noted.

Characters can be located in increments of 1/84 in. vertically and 1/70 in. horizontally.

The device was designed to handle a wide range of printing requirements and to operate in industrial environments, a spokesman said from Dennison Manufacturing at 300 Howard St., Framingham, Mass. 01701.

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Personal Micros Break Into Business

• *Apple Offers 48K Bytes*

Apple Computer Apple II Business System

By Brad Schultz
CW Staff

CUPERTINO, Calif. — Apple Computer, Inc. made it a trend — unveiling its first no-nonsense business system for less than $5,000 just as Radio Shack made the same leap from personal to big league commercial computing.

The basic Apple II Business System offers the Apple II Plus MPU with 48K-byte random-access memory, two disk drives, a CRT and Apple's Controller software.

The Apple II Plus is an upgrade of the Apple II processor first sold in 1977 and features an expanded version of Basic intended for business applications.

The Apple II Business System also features an auto-start read-only memory chip that reportedly provides automatic disk loading as the system turns on, reset protection and easy screen editing.

Though Apple called the system suitable for large as well as small businesses, it is aimed at the latter. Designed for small business personnel, the Controller software is self-prompting and requires no programming knowledge, the vendor maintained.

The Controller software offers a "fail-safe" data entry feature that signals typing errors with an audible warning and automatically copies data files so they are available if the originals are lost. Moreover, reports are automati-

(Continued on Page 78)

• *Radio Shack Touts Speed*

Radio Shack TRS-80 Model II

By Ann Dooley
CW Staff

NEW YORK — In an action designed to give minicomputer competitors a run for their money, Radio Shack entered the small business market last week with the TRS-80 Model II, a microcomputer that provides greater speed and increased data storage over the original TRS-80.

The TRS-80 Model II can operate as a general data processing machine, an intelligent terminal or as a word processor system at twice the speed of its predecessor — all for $3,450, the firm said.

The system's processor is built around an 8-bit, high-speed 4 MHz microprocessor with 32K or 64K bytes of random-access memory. One built-in 8-in. floppy disk stores an additional 512K bytes — including a disk operating system — which is

(Continued on Page 78)

Disk Subsystems Fit DG Machines

WESTBORO, Mass. — Data General Corp. has released two disk storage subsystems, one for its Micronova line of microcomputers and one for the larger Nova and Eclipse systems.

Both the DG 6102 and 6099 subsystems offer Winchester-type technology and capacities of nearly 12.6 million bytes per disk, formatted in 512-byte sectors. There are 384 tracks per surface divided into two 192-track bands on each of two surfaces, DG stated.

A separate read/write head accesses each band, and each 4-track disk cylinder can hold 64K bytes in 128 sectors.

Winchester technology is noted for high reliability and being virtually maintenance-free, a spokesman said. It uses low-mass, lightly loaded read/write heads sealed in a "contamination free" module.

The heads reportedly "fly" about 20 millionths of an inch over the disk surface.

Each subsytem's read/write head seek actuator is driven by a stepper motor, but controlled by a microprocessor, the spokesman said. He put required times for track-to-track search and random average search at 15 msec and 60 msec respectively.

The 6102 for Micronovas and 6099 for Novas and Eclipses cost $4,800 and $5,100, respectively, DG said from Rt. 9, Westboro, Mass. 01581.

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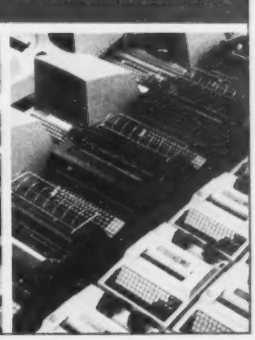

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National Semi Offers 64K Bytes

Error Correcting Memory Ready for PDP-11/34

SANTA CLARA, Calif. — Error correcting single-board memory for Digital Equipment Corp.'s PDP-11/34 minicomputer is available from National Semiconductor Corp.

The 64K-word (128K-byte) NS11/34E memory has single voltage power requirements and features single-bit error correct/multiple-bit error detection circuitry. Both these features make the memory suitable for applications demanding maximum system uptime and minimal user maintenance, National Semi maintained.

With a "typical" write access time of 100 nsec, the NS11/-34E is 50% faster than DEC's MS11-L memory, the vendor claimed. An on-board error log can be queried in the maintenance mode via the PDP-11/34's programmer console or any similar I/O device.

To simplify battery backup requirements, the NS11/34E uses a single voltage (+5V), a spokesman noted. The memory features a partitioned powerplane for minimal battery drain so only the memory elements and refresh circuitry are powered in the reserve mode.

The NS11/34E uses address and data latches to isolate the memory from the bus and to permit the bus to be released within 100 nsec during write operations. Reads are completed in 425 nsec to further boost throughput and enhance bus utilization, the spokesman said.

The memory includes onboard parity generation and check circuitry to eliminate the need for a separate card, thus freeing a slot and reducing overall cost, he added.

With OEM discounts available, the NS11/34E costs $4,325. National Semi is located at 2900 Semiconductor Drive, Santa Clara, Calif. 09501.

Apple II Set as 48K-Byte System

(Continued from Page 77)

cally printed before the system will allow the user to close out monthly books, Apple continued.

Business Software

Like the software supporting Radio Shack's TRS-80 Model II, Apple's Controller includes general ledger, accounts receivable and accounts payable modules. Reflecting Apple's attention to the needs of large users, the general ledger application maintains a file of up to 250 different types of accounts with any one account retaining as much as $99 million.

With that application, customer and vendor account transactions can be created and posted to the general ledger automatically, without redundant typing, Apple said.

The accounts receivable module maintains a file of up to 250 customer accounts and can process 1,000 invoice statements per month. The module summarizes receivables, organizing them by the number of days each bill has been outstanding.

Monthly account statements are printed automatically for customer billing. Mailing labels, customer lists and sales commission reports by individual salespeople are also generated.

The accounts payable module maintains a file of 100 vendors, accommodating 300 monthly invoices — each holding as much as $99,000. This application organizes payables by due data so, in planning cash flow, a business can customize bill paying to take advantage of discounts and varying net terms, Apple stated.

The complete business package, processor, two disk drives, CRT, impact printer and all necessary documentation cost $4,995. Other applications software is available at various prices, Apple noted from 10260 Bandley Drive, Cupertino, Calif. 95051.

Speed of TRS-80 Model II Touted

(Continued from Page 77)

100,000 more characters than a TRS-80 with four minidisk drives, according to the firm.

The system can be expanded to a two-, three- or four-disk system for up to 2M bytes and thus is equivalent to two double-density, dual sided IBM 5110 disk drives at half the price, Radio Shack said.

The one-disk, 32K-byte Model II costs $3,450 and the one-disk, 64K-byte Model II costs $3,899.

Video Monitor

The system features a built-in, 12-in., high-resolution video monitor capable of displaying 24 lines of 80 normal characters or 40 expanded characters in both upper and lower case.

With 1,920 characters, the display features nearly twice the number of characters displayed by the IBM 5110 and the TRS-80, Radio Shack noted.

The 76-key keyboard includes functions such as "Control," " Escape Caps," "Hold" and "Repeat" and two software-programmable special function keys. The keyboard is detachable for more convenient data entry, a spokesman said.

The Z80 microprocessor and memory reportedly operate nearly twice as fast as the original TRS-80. The Direct Memory Access controls the data transfer between memory and disk, allowing the MPU to concurrently perform other tasks.

An enhanced Level III version of the TRS-80 Basic and TRSDOS operating system are automatically loaded in memory when the machine is turned on. Since all of the Model II's software is loaded from disk into internal memory, future languages will allow maximum available memory with nothing lost to a language in read-only memory which is not used, according to Radio Shack.

Self-Testing Ability

The Model II tests itself each time it is powered up to ensure proper operation, the firm said. All I/O operations are vector-interrupt-driven.

Built-in I/O capabilities include two RS-232C channels and one Centronics Data Computer Corp. parallel port. Future expansion is provided through four plug-in slots for optional printed circuit boards, the spokesman noted.

Software is immediately available for the Model II and includes fives business packages including general ledger application which handles up to 500 accounts, a payroll system capable of handling 500 employees in up to three different states and an accounts receivable package. Programs range in price from about $150 to $400.

Software allowing the Model II to perform as a word processor with the addition of a printer will be introduced soon, Radio Shack stated, as will other application packages.

The Model II is not intended to compete with or replace the TRS-80, the firm pointed out. Radio Shack will fully support the original TRS-80 with software, it stated, adding that several applications — such as a stock analysis package, a Fortran package and a link to Western Union's Mailgram service — will be introduced soon.

Two Printers

Radio Shack also introduced two peripherals in conjunction with the Model II. The Line Printer III has a full 13-in. wide screen, 132-character lines and a 9 by 7 dot matrix. It prints upper and lower case letters.

The impact printer runs at 120 char./sec. For faster throughput, the head prints in both directions as it moves across the paper, the firm said.

The fully adjustable tractor mechanism feeds continuous forms of varying width up to a maximum of 15 in. while assuring accurate alignment, according to the firm. The Line Printer III costs $1,999 including the cable.

A second printer, the Line Printer II, operates at 50 char./sec on 8-in. lines of 80 characters each and sells for $999. It prints expanded letters under software control and features upper and lower case letters in a 7 by 7 dot matrix.

This small printer operates in friction-feed and pin-feed modes. Continuous forms 9.5 in. wide are kept in alignment by nonadjustable pins built into the platen.

The Line Printer II can be used with the TRS-80 Model I using the expansion interface.

The TRS-80 Model II and both line printers can be purchased at Radio Shack's network of stores throughout the country. The firm's headquarters is at 1300 One Tandy Center, Fort Worth, Texas 76102.

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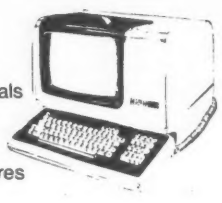

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For Accountants, Doctors

Turnkeys Based on PE CPUs

AUSTIN, Texas — A turnkey accounting system and a turnkey medical office management system — both built around 64K-byte Perkin-Elmer Corp. (PE) CPUs — are available from AIS Data Systems, Inc.

The AIS-10 system features a CRT terminal, a 180 char./-sec printer and three double-density floppy diskette drives or 32M bytes of disk storage, half of which is removable.

Other features, according to the company, include general ledger software with "unlimited" subaccounts, multilocation or departments, automatic consolidations, automatic closeouts, controlled summarization, unlimited history, prior-period reporting and adjusting, job costing, budgeting, comparative reports and cost classification reports. Word processing is also available.

The AIS-10 is written in Cobol, but Basic and Fortran can be accommodated, AIS Data added.

The vendor's medical office management system, called HBC-10, includes a 64K-byte CPU, a CRT terminal, a 180 char./sec printer and 32M bytes of disk storage, half of which is removable.

The HBC-10 offers billing, practice analysis, insurance form completion, patient histories, appointment scheduling and word processing. Patient statements are printed, and balances are available on histories and appointment schedules, AIS Data stated.

Further, information on insurance programs can be stored and patient transactions can be reviewed for claims processing. Practice analysis reports provide the frequency and dollar amounts for different types of services, AIS Data continued.

The AIS-10 turnkey accounting system costs $17,950 with the floppy diskettes and $22,950 with the 32M-byte disks. The HBC-10 medical management system costs $25,950, or may be leased.

AIS Data is at 5511 Parkcrest, Austin, Texas 78731.

LSI-11 Gains Controller For Disks

IRVINE, Calif. — Plessey Peripheral Systems, Inc. has announced a cartridge disk controller for systems based on the LSI-11 microcomputer from Digital Equipment Corp.

The microprocessor-driven PM-DCV11 controller supports up to 20M bytes of memory and is software-compatible with DEC's RT11 and RSX-11 based operating systems, a spokesman stated. The controller was also termed compatible with system and diagnostic software for DEC's RK05 and similar disk drives.

The PM-DCV11 features a low-power Schottky design that reduces power requirements, the spokesman continued. Programmable read-only memory (Prom) drive select reportedly provides automatic retry on seek errors and overlap seek capabilities. Moreover, the first in/first out buffering technique allows a direct memory access transfer rate of 6.4 microsec per word.

The Plessey controller supports a drive of 100- or 200 track/in. at 1,500- or 2,400 rev/min.

The PM-DCV11 costs $1,800 with quantity discounts available, Plessey said from 17466 Daimler Ave., Irvine, Calif. 92714.

Bulk Memory System Fits Range of Minis

GAITHERSBURG, Md. — A bulk memory system that ranges from 256K bytes to 1M byte in capacity and reportedly interfaces with "all popular mini- and microcomputers" is available from Plessey Microsystems.

The Megabyter consists of up to four standard memory cards containing 160K bytes of MOS random-access memory (RAM), a universal control unit, a power supply unit, fans and filters.

It also has provisions for up to four custom-designed interface cards, which are plugged into a wire-wrapped backplane, a company spokesman explained.

User space is available for a custom processor board with special I/O or control cards; for fast cache, nonvolatile or serial memory cards; or for memory expansion or extension of the standard 18-bit word length, the spokesman said.

The unit's 19-in. chassis provides forced-air cooling which, with error detection and correction, is said to give a calculated mean time before failure of 148,000 hours for the memory boards. For a fully populated 512K word system, the mean time before failure is more than 20,000 hours.

Primarily intended for systems with cycle times of 500 nsec, the unit offers a data rate of up to 8M bit/sec.

A unit with a capacity of 256K bytes costs approximately $8,000 when ordered in volume, while the maximum-capacity 1M-byte model costs $21,200.

More information can be obtained through Plessey's U.S. offices at 19546 Clubhouse Road, Gaithersburg, Md. 20760 and 1641 Kaiser Ave., Irvine, Calif. 92714.

Data Storage System Suits Miniature Tape Cartridges

HAUPPAUGE, N.Y. — A three-cartridge data storage system based on the miniature tape cartridges made by 3M Co. and others is being offered by the Qantex Division of North Atlantic Industries, Inc.

The Model 1200 is said to record two tracks of data on each cartridge at a density of 1,600 bit/in. for a capacity of 672,000 bytes per cartridge, or nearly 2M bytes of unformatted capacity with all three cartridges, a company spokesman said.

The memory is based on Qantex's Model 200 minidrive tape transports and operates the tapes at 30 in./sec during recording to produce a 48,000 bit/sec data transfer rate.

All three tape transports can be selected independently and can be operated in the search mode at a tape speed of 90 in./sec, according to the firm. The system reportedly incorporates file and block counters for locating selected data.

Interfaces Available

The Model 1200 is offered with interfaces for the PDP-11, LSI-11, SBC 80/20, Rolm and Nova minicomputers, among others. In addition, the memory is equipped with an RS-232C communications interface that is said to handle variable transmission rates of up to 9,600 bit/sec.

The Model 1200 is available in three different versions. With one cartridge transport, the unit costs $2,260; with two cartridge transports, it costs $2,690; and with three cartridge transports, it costs $3,150.

North Atlantic Industries is at 60 Plant Ave., Hauppauge, N.Y. 11787.

DEC PDP-11, LSI-11 Get Links

IRVINE, Calif. — Two computer link boards, one intended for Digital Equipment Corp. PDP-11 series minicomputers and the other for either DEC LSI-11 or PDP-11/03 minis, have been announced by Able Computer Technology, Inc.

Interlink/Uni is a full replacement for the DR11-B and DA11-B that can be used in any model of the PDP-11 series, according to a company spokesman.

It provides software-transparent direct memory access (DMA) interface and Unibus link at a rate of up to 500,000 word/sec at distances of up to 50 ft, the firm claimed. Contained on a single hex-width board, it reportedly plugs into any SPC slot and presents only one load to the Unibus.

A DEC-supplied computer link requires two system units, one per computer, to achieve the same performance, the spokesman claimed. When used with Interlink/LSI, Interlink/Uni supports a PDP-to-LSI link.

Interlink/LSI is a single quad-width board that plugs into the LSI-11 or PDP-11/03 and is said to provide full DRV11-B (DMA interface) and DA11-B equivalent (Q-Bus link) capability.

It is software-transparent and operates at the full Q-Bus transfer rate at distances of up to 50 feet. When used with Interlink/Uni, Interlink/LSI supports an LSI-to-PDP link, the spokesman said.

The Uni costs $1,500 and the LSI costs $795, with quantity discounts available. Able Computer Technology is at 1751 Langley Ave., Irvine, Calif. 92713.

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Throughput Improved Six Times

Mini Lets Pharmacies Dispense With Paper

GLENDALE, Calif. — A six-fold improvement in throughput and an increase in the number of services to patients have resulted from the addition of a minicomputer-based information system to a consulting pharmacist's operation.

Using a manual system, Rush Pharmacies formerly serviced 3,500 long-term patient beds located in skilled nursing centers throughout southern California, employing 12 clerical workers to do it.

"Paperwork was beginning to drown us," according to Dr. Lawrence Niemerow, chief executive officer of Niemerow Pharmacies, Inc., of which Rush Pharmacies is a three-branch division.

After moving to an automated system in 1972, however, the number of clerks needed to back up Rush's three consulting and seven dispensing pharmacists was cut to five, and Rush began serving 9,000 beds, Niemerow said.

With automation and fewer personnel, it actually became easier for Rush to maintain patient drug profiles, monitor drug interactions and allergies, keep apprised of Medicaid changes in approved drugs, process third-party billing and maintain inventory control and accounts receivable.

In 1972, Niemerow considered a few large computer manufacturers, including Digital Equipment Corp., before going with a turnkey system from Management System Technology, Inc. that uses proprietary software and Hewlett-Packard Co. hardware.

While Rush's first computer system was built around an HP 2100 minicomputer, the firm recently upgraded to an HP 2100 MXE with 128K bytes of main memory, eight HP 2645A CRT terminals, 150M bytes of disk storage, a 300 line/min, Teletype Corp. Model 40 printer, three 180 char./sec HP 2631A printers and one 600 line/min 2614A line printer.

In addition to improving throughput "despite a recent explosion in government-ordained paperwork," according to Niemerow, the system has also made it possible to provide more services for patients.

Upon the admission of a patient to a Rush-supported skilled nursing facility, Rush pharmacists obtain a list of the patient's allergies and other pertinent personal and medical facts. The data is entered into the computerized patient profiles, and the computer assigns a composite number to the patient indicating the individual and the facility. Accuracy is verified visually on the CRT when the data is entered.

When a prescription is entered, the computer performs validity checks to block the entry of incorrect information. The minicomputer scans the patient's profile for possible allergies to the drug and checks the drug for possible adverse interactions.

The computer is also programmed to flag any attempts to refill prescriptions prematurely or to duplicate orders.

(Continued on Page 82)

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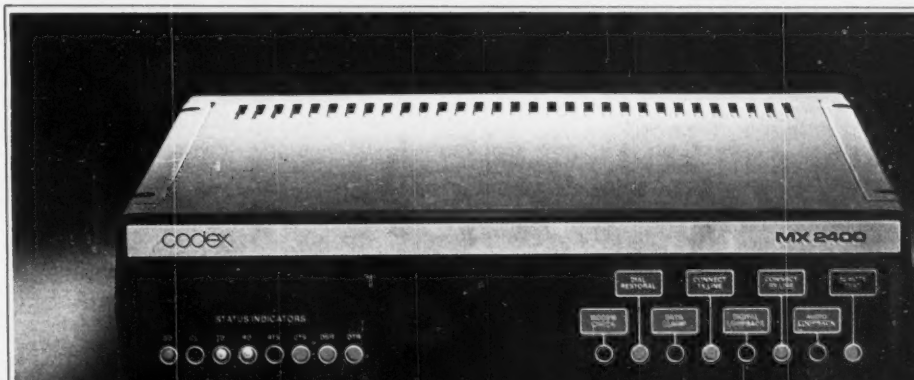

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Cuts Examination Time 75%

Mini-Based Unit Aids Lung Disorder Diagnosis

UPLAND, Pa. — Examination time for pulmonary patients has been reduced from two hours to 30 minutes per patient following the installation of a real-time minicomputer-based diagnostic aid in a medical center here.

"We designed a system to meet our needs, knowing we eventually wanted to hook into two different laboratories," according to Dr. Leonard Berkowitz, assistant director of the Pulmonary Division of the Crozer-Chester medical center.

Looking to design a system that would reduce diagnostic time and increase accuracy, the center selected Hewlett-Packard Co.'s HP 1000 system to use as its base.

The system has enabled the medical center's Pulmonary Functions Laboratory to measure a patient's treatment progress, lower the cost of examinations and increase the number of patients examined in a given period.

Doctors can identify pulmonary disorders by comparing prebronchodilator test results with normal values based on the age, height and sex of the patient. The results of a postbronchodilator test conducted after treatment allow the physician to measure the patient's progress.

These up-to-the-minute tests measure various parameters of the patient's pulmonary functions as the patient breathes. The patient inhales and exhales into a wedge spirometer that provides analog data for conversion to digital signals for computer analysis.

Test results appear on a CRT terminal for quality control monitoring by technicians, and hard-copy data printouts are produced.

The hard-copy analyses include the patient's name, age, height, weight, sex, race and Social Security Number and the date of the initial hospital visit, a data review of the flow volume tests (both pre- and postbronchodilator), a list of the tests conducted and an interpretation of their results.

Acting strictly as a diagnostic aid to the doctor, the computer bases its analyses on comparisons with the norm written into the program for persons of prescribed ages, heights and weights. The algorithms for data collection, analysis and interpretation were all developed and programmed in-house.

The tests aid doctors in diagnosing patients already afflicted with or susceptible to smoking-related disorders, asbestosis, emphysema, asthma, chronic bronchitis and other lung diseases.

By comparing the pre- and postbronchodilator tests, doctors can determine whether their prescribed treatment is having an effect on the patient or whether decreased exposure to the lung irritant has reduced the patient's risk of lung disease.

The medical center, well known for its burn treatment facilities, also uses the computer to assess the pulmonary functioning of burn victims who have suffered lung damage because of smoke inhalation.

The effectiveness of the center's time-saving system can be traced to the HP 1000 Read-Time Executive III operating system. The computer is configured with 128K bytes of memory and 20M bytes of on-line disk storage.

Other equipment includes an HP Model 2648 CRT graphics terminal, an HP Model 2635 dot matrix printing terminal and a modular lung analyzer. A two-channel digital-to-analog computer card and two 16-channel analog-to-digital cards are hardwired into the wedge spirometer.

Crozer-Chester's cardiology department, impressed with the system's performance in the pulmonary lab, plans to use the computer for tests in its exercise laboratory. Additional hardware, including a cardio-tachometer and a mass spectrometer, will be used to measure various parameters of the cardiac system.

Because the system has resulted in lower costs for pulmonary testing, routine employee testing programs may be initiated and sponsored by local industries.

Q-Bus Terminal Unveiled For DEC PDP-11 Users

MISSISSAUGA, Ont. — An intelligent terminal for Digital Equipment Corp. PDP-11 users has been announced by Transduction Limited.

The VT-100-QB terminal is said to combine the features of the basic DEC VT100-AA terminal with the "advantages and computing power" of the standard LSI-11 microcomputer, according to a company spokesman.

The VT100-QB has a built-in LSI-11 backplane with four dual-size option slots and can be configured with many standard LSI-11 modules for PDP-11/03-equivalent operation, the spokesman said.

The unit can be used as a terminal or stand-alone computer with local program development and hardware expansion capabilities. It reportedly offers an alternative to PDP-11 series terminals that include an LSI-11 chip set but do not have a standard Q-Bus and do not allow for program development with the RT-11 operating system.

Only standard LSI-11 modules are used in the VT100-QB terminals, the spokesman said. The present configuration allows for expansion of the system and is normally supplied with an RX02-compatible, 1M-byte dual floppy disk for operation equivalent to that of the PDP-11/03.

LSI-11 modules and floppy disk are optional. The terminal costs $2,395 from Transduction at 1655-4 Sismet Road, Mississauga, Ontario Canada L4W 1Z4.

Pharmacists Dispense With Paper

(Continued from Page 81)

"With the system, we no longer have to worry about a pharmacist reading his mail about Medi-Cal changes," Niemerow noted. If a new drug is approved for coverage by Medi-Cal — California's Medicaid system — or an existing one is removed from the program, one entry in Rush's computerized drug file suffices in lieu of numerous notices to company peronnel.

Any attempt to prescribe an unapproved drug to a Medi-Cal patient is then disallowed by the computer.

If a prescription meets the rigid checks and balances programmed into the system, the computer prints the label. If, however, a possible allergy or interaction exists, the computer will print a warning label. The pharmacist can then call the duty nurse or doctor to verify the validity of the warning. If the warning is valid, a change in the order is requested from the attending physician.

Fringe Benefits

Another by-product of the Rush system is a monthly medication administration record that posts the drugs prescribed for the patient. Nurses can initial the record at the exact time dosages are given.

In addition, the system creates a physicians order record, a monthly recapitulation of prescriptions filled for a doctor's patients.

Another Rush program reports drug inventory balances and determines exactly how many doses were dispensed — information that is used in planning for the Niemerow manufacturing division.

Labels are produced by the computer system on carbonless duplication paper. The duplicate label is then used by the hospital nurse for reordering. The label copy is placed directly on the reorder form and eliminates the need for rewriting.

The computer monitors reorders as well, making sure the dosage already dispensed has been administered.

In addition to the standard prescription label requirements, the computer-printer label lists the patient's billing status, the associated hospital, the number of days between refills, the drug allergies and interactions that might possibly develop and the pharmaceutical date.

Once the computer label is attached to a unit dosage card, nurses can determine what medication has been given and what is outstanding.

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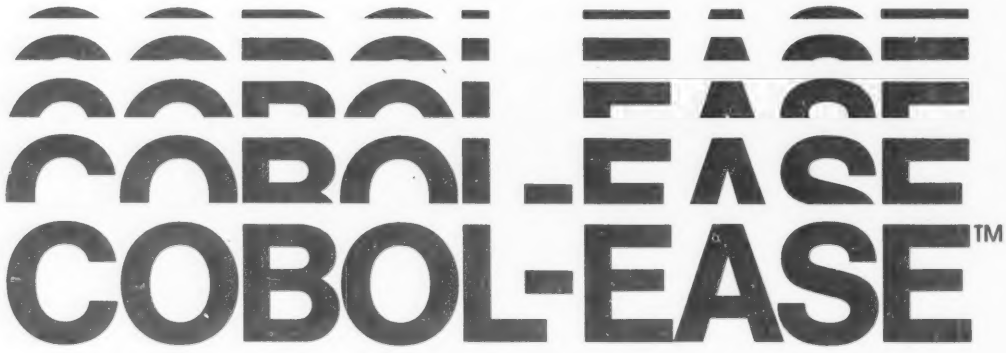

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A Survey of What's Available

Gear Compatible With TRS-80 Plentiful

By William L. Colsher
Special to CW

One measure of the popularity of a computer system of any size is the number of manufacturers that produce devices compatible with that system. The TRS-80 microcomputer system from Radio Shack is, by this measure, one of the most popular computers ever introduced.

This is a survey of many of the TRS-80-compatible products which have been introduced. Included are memory expansion kits, floppy disk drives and controllers, I/O interfaces, S-100 bus interfaces, some miscellaneous devices and system software.

Because it is so simple to expand the TRS-80's memory (simply plug in the memory chips), memory expansion kits are the most widely available compatible product. Most of these kits consist of a set of eight 4116-type memory chips, jumper blocks to enable the computer to address the expanded memory and a page or so of instructions.

When expanding the TRS-80 memory, it is important to keep two points in mind. First — and most important since it always occurs — the Radio Shack warranty is voided when the TRS-80 cabinet is opened. If the system is already out of warranty, later repairs at Radio Shack will cost more as well.

The second point to remember is that the timing involved with dynamic memory chips is rather critical. The TRS-80 was designed so the refresh signals are very close to the "far edge" of the memory chips' requirements. A very slightly slow chip could test out OK and then not function in a TRS-80 because of this. Some of the less expensive kits and those without guarantees of some sort may suffer from this problem.

Figure 1 provides a list of sources and prices for 16K-byte memory kits for the TRS-80. The average price is presently about $80, with most of the kits in the $90 to $95 range. As in all the figures, manufacturers are listed alphabetically.

I/O Interfaces

One of the biggest problems with the TRS-80 is that without a $299 expansion interface from Radio Shack, no input/output devices other than Radio Shack's printers can be added to the basic system.

Almost as soon as the memory expansion became available, a number of companies began to provide I/O interfaces, primarily RS-232- and 20mA-compatible for use with

(Continued on Page 87)

MEMORY EXPANSION SUPPLIERS 16K-BYTE INCREMENTS

MANUFACTURER	PRICE
ABS Software/Hardware Suppliers	$ 65.00
Automated Computer Software Service	$ 99.95
Hobby World Electronics	$ 80.00
Ithaca Audio	$140.00
Jade Computer Products	$ 75.00
Jameco Electronics	$ 99.95
Microcomputer World	$ 79.00
Priority One Electronics	$ 65.00
The CPU Shop	$ 85.00
Tora Systems, Inc.	$ 89.95
V.R. Data Corp.	$ 98.00

Figure 1

INPUT/OUTPUT INTERFACES

COMPANY	DEVICE	DESCRIPTION	PRICE
Alpha Product Company	Interfacer 2	8-Bit parallel I/O; Two output bits are relays	$85.00
Electronic Systems	TRS-80 Serial I/O	RS-232 serial port	$79.95*/$59.95** $19.95***
G.P.A. Electronics	Hard-Copy Interface	RS-232 output only	$69.95
Small System Hardware	Para-Port	8-Bit parallel I/O	$99.00
Small System Hardware	TRS-232	RS-232/20MA output only	$49.95
Telesis	VAR-80	8-Bit parallel	$105.00
V.R. Data	Calculator Keypad	Numeric keypad with cable	$79.95

*Assembled. **Kit. ***Bare Board.

Figure 2

DISK CONTROLLERS AND EXPANSION UNITS

COMPANY	DEVICE	FEATURES	PRICE
G.P.A.	External 6-slot motherboard and power	RAM, Eprom, I/O available, disk controller soon	$129.95
Micromation	Mega Box	Includes dual double-sided floppies (8-in.) and space for 32K RAM.	$2,295.00
Parasitic Engineering	8-in. floppy interface and one drive	Mounts in R.S. expansion box and allows both mini and 8-in. drives at same time	$995.00

Figure 3A

Intel SDK-86 Kit Offers 8086 MPU, Memory and I/O

SANTA CLARA, Calif. — Intel Corp. is now offering users the SDK-86, a complete 8086 microcomputer system on a board with memory and I/O systems in kit form.

The stand-alone 16-bit micro gives designers hands-on experience with Intel's 8086 16-bit HMOS microprocessor, according to a spokesman.

The kit includes an 8-digit LED display, a 24-key keyboard and all other components from resistors and crystal to CPU, the firm stated. The SDK-86 is easily assembled and is ready to go when connected to a power supply, the firm claimed.

For data memory, there are 2K bytes of 2142 random-access memory (RAM) with room for 8K bytes of program memory using either or both of the keyboard and teletypewriter/CRT 4K read-only memory (ROM)-resident software monitors included in the kit or a 2716/2316E combination.

Programs and data may be entered by the keyboard, by a built-in serial communications interface or via cable to any Intel Intellec Microcomputer Development System.

Besides the 8086 MPU, 8K bytes of 2316 or 2716 ROM and 2K bytes (expandable to 4K) of 2142 RAM, the kit includes 48 parallel I/O lines implemented through two 8255A Programmable Peripheral Interface devices, an RS-232 or current-loop serial I/O structure implemented via an 8251A Usart, TTL-compatible bus signals and parallel I/O signals, 24-key hex data and control keyboard and 256 vectored interrupts.

A design library provided with the kit includes both the assembly and user's manuals plus an MCS-86 user's manual and 8086 assembly language reference manual.

The SDK-86 kit costs $780 from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Home Micro From TI Offers Color Video Monitor

HOUSTON — Texas Instruments, Inc. has introduced a microcomputer called the TI-99/4 aimed at the home market. The system consists of a console connected to a 13-in. color video monitor from Zenith Radio Corp.

The TI-99/4's programs are in solid-state packages that plug into the command module like 8-track tape cartridges. The circuitry provides random-access memory storage of 16K (8-bit) bytes, the firm said.

The TI-99/4 features extended Basic language. Eight to 10 programs ranging in price from $19.95 to $69.95 will be available initially.

A wide range of sound effects and 16 colors for graphics are included in the system. Accessories for the system include a solid-state speech synthesizer with a 200-word vocabulary and a joystick.

Two remote controls and up to three peripherals can be connected to the system at the same time, a spokesman noted.

The TI-99/4 costs $1,150 and will be available in computer retail stores and some department stores by late summer, according to the firm. TI can be reached at P.O. Box 1443, Houston, Texas, 77001.

Micro Has Winchester-Type Rigid Disk Drive

CUPERTINO, Calif. — A Z80-based microcomputer system containing an 8-in., Winchester-type rigid disk drive has been introduced by Onyx Systems, Inc.

Called the C8000, the micro incorporates a 4 MHz Zilog, Inc. Z80A MPU, a 10M-byte rigid disk and a 12M-byte cartridge tape drive, all in a tabletop package. The unit simultaneously supports a full array of peripherals including a system console, serial and parallel printers and most standard modems.

The system was designed for both OEMs and end users that can't afford expensive cartridge disk systems but need greater storage and performance than a floppy disk provides.

The C8000 has 64K bytes of dynamic random-access memory with parity, using 16K devices. A general-purpose direct memory access (DMA) controller speeds disk transfers and can be used to transfer blocks to and from the parallel port.

Other features include three general-purpose RS-232 serial I/O ports, an 8-bit bidirectional parallel port with parity and a real-time clock.

The C8000 costs $12,500 from Onyx at 10375 Bandley Drive, Cupertino, Calif. 95014.

Micro's Minifloppies Hold 300K Bytes

PROVO, Utah — Billings Computer Corp. has introduced a Z80-based microcomputer that features dual 5-in. minifloppy drives of 300K-byte capacity and an internal memory of 64K (56K user random-access memory [RAM] with 8K reserved RAM and read-only memory).

Specifications include two RS-232 asynchronous and synchronous serial I/O ports, a 4 MHz clock and a 12-in. CRT. The system uses a 94-key, typewriter-format keyboard with a numeric pad and 16 function keys.

Several software packages including business accounting, Fortran, Cobol and E-Basic are included with the system, which costs $4,595.

Billings is at 2000 E. Billings Ave., Provo, Utah 84601.

Apples Get Disassembler

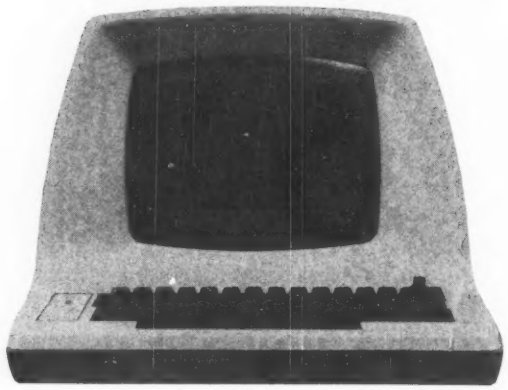
REDONDO BEACH, Calif. — Microproducts has introduced a two-pass disassembler for the Apple Computers, Inc. Apple II microcomputer.

This programming tool disassembles any machine language program that resides in the Apple II, such as Basic, the disk operating system and printer driver routines.

The disassembler creates a text file and assigns labels that enable the programmer to make them more useful for his purposes, the firm said. The two-pass disassembler also creates a text file for the Microproducts/Apple II Text Editor/Assembler.

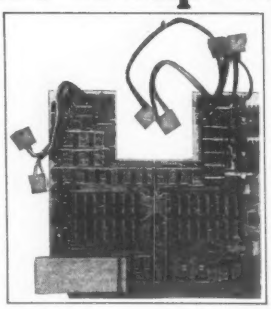
The disassembler is available on cassette with instructions for $29.95 from local retail computer stores or from Microproducts at 2107 Artesia Blvd., Redondo Beach, Calif. 90278.

Smart move



for a dumb terminal.

Retro-Graphics™



Retro-Graphics transforms the ordinary Dumb Terminal into a sophisticated graphics terminal. Check these features:
Packaging: Mounts inside the Lear Siegler ADM-3A. Installation requires no cutting or soldering.
Performance: Microprocessor based. Generates graphs and pictures on a 512 by 250 plotting grid.
Compatibility: Tektronix Plot 10 software compatible. Replaces Tektronix 4006's, 4010's and 4025's in many applications.
Affordability: $1150.00 Domestic single unit price. Retro-Graphics is now available through US and European distributors. Call or write today for details.

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1787-K TRIBUTE RD. • SACRAMENTO, CA 95815 • (916) 920-5600

Lear Siegler and Dumb Terminal are registered trademarks of Lear Siegler Inc.
Tektronix, 4006, 4010, 4025 and Plot 10 are registered trademarks of Tektronix Inc.

'Capdoc' Makes A Typewriter

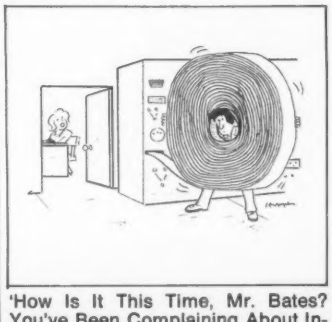
WATERTOWN, Mass. — Microcomputers can now become intelligent or memory typewriters with a software family written in 8K Basic, according to Monoson Microsystems, Inc., the vendor.

Computer-Assisted Preparation of Documents (Capdoc), the first package of the series, combines operator training, word wrap, justification, centering, underlining, merging of text and boldface print, proportional spacing and dual-column printout with magnetic storage and full-screen display, the firm said.

The software provides automatic page numbering and headings, and the documentation demonstrates how it can be combined with other subroutines to develop short, task specific programs, such as filling in forms, preparing mailing lists and generating envelopes.

This first package consists of the Capdoc/intelligent typewriter, the Capdoc/memory typewriter and a printout guide. The package is available for a license fee of $34.95.

Monoson Microsystems can be reached at P.O. Box 97-A, Watertown, Mass. 02172.



'How Is It This Time, Mr. Bates? You've Been Complaining About Insufficient Data.'

TRS-80 Field Survey Finds Much Compatible Gear

(Continued from Page 85)

widely available printers and modems.

Figure 2 lists a number of I/O interfaces which do not require the use of the Radio Shack Expansion Interface.

Mass Storage

In order to make maximum use of a computer system, some form of mass storage is required. In the personal computer field, the mass storage unit of choice has been the floppy disk.

On the TRS-80, an expansion unit is required to provide the extra memory space and the controller necessary for effective usage of the disks.

Several manufacturers have recently introduced such expansion units; a number of others are providing plug-compatible disk drives for use with any of the systems. Figure 3A (see Page 85) lists currently available expansion units along with their capabilities, and Figure 3B contains a summary of the compatible minifloppy drives.

Though some of the expansion units are capable of operating with full-sized floppies, none are listed since they cannot be used with the Radio Shack controller.

Miscellaneous Items

In addition to the common types of hardware discussed above, a number of manufacturers are producing some interesting devices which can only be grouped under the heading "miscellaneous." Among these items are S-100 bus interfaces, a kit to add lower case capability and a speech synthesizer.

Figure 4 shows some of these strange and useful devices. It is probably not as complete as some of the other tables, but serves to indicate the type of product available.

The major system software that has been made available for the TRS-80 is shown in Figure 5. Notably, the major operating system for minicomputer systems — CP/M — works with the TRS-80. This makes available for TRS-80 owners a considerable software library which currently contains about 35 full disks of programs developed by CP/M users.

Figure 5 contains a list of some of the most important software currently available for the TRS-80, but does not contain any applications type software.

Completing the survey is an alphabetical list of the names, addresses and phone numbers when available of all the manufacturers listed elsewhere in this article. All information was accurate as of April 1979.

Because of the volatility of the small computer field, I recommend that users call or write these companies for the latest price and availability information.

TRS-80 COMPATIBLE DISK DRIVES

COMPANY	PRICE	COMMENTS
Cost-Effective Computer Services	$339.00	Includes cable.
Percom	$399.00	
Vista	$395.00	67.8K bytes per drive.

Figure 3B

MISCELLANEOUS DEVICES

COMPANY	DEVICE/DESCRIPTION	PRICE
Computalker Consultants	Computalker (Voice synthesizer)	$495.00
HUH Electronics	Mini-8100 (Four-slot S-100 motherboard; requires power supply)	$155.00*/$115.00*
	Mini-8100S (Plugs into existing mainframe)	$125.00*/$95.00**
HUH Electronics	8100 (Options include space for old 4K dynamic RAM chips, RS-232 or 20ma I/O, Parallel I/O, requires power supply)	From $185.00**
Micro-Mega	Cassette Control Unit	$37.50
Mumford Micro Systems	Speed Kit (Runs TRS-80 MPU at 880 KHz, 1.77 MHz or 2.66 MHz switch-selectable)	$24.95
Parasitic Engineering	Shuffleboard — deselect system ROM's to allow programming in low memory. Includes CP/M on 8-in. disk.	$249.00
Quant Systems	Lower Case Modification Kit	$14.95
The Peripheral People	Data Dubber — Off-line tape copy	$39.95
WEB Associates	TBEEB (Software-controlled beeper)	$27.95

*Assembled. **Kit.

Figure 4

SOFTWARE

COMPANY	PRODUCT/DESCRIPTION	PRICE*
Digital Research Corp.	CP/M (Disk operating system)	$150.00
Michael Shrayer Software	Electric Pencil (Text editor)	$100.00 Tape/-$150.00 Disk
Microsoft	TRS-80 Fortran (Fortran compiler and development system)	$350.00
Microsoft	Assembly Language System	$175.00
Tiny-C Associates	Tiny-C (Subset of the C language)	$30.00 Cassette $40.00 Source
G.D.E.	CBasic-2 Extended Basic compiler	$89.95
RACET	Disk Sort	$34.95
	Remodel (Basic program number)	$24.95
	Remodel + Proload (above and merge programs from tape)	$34.95
Programma International, Inc.	Forth (threaded programming language)	$34.95
	Programma Improved Editor	$19.95
V.R. Data	Diagnostic (TRS-80 routine)	$34.95
Organic Software	Text Writer II (Text editor)	$75.00
GRT Corp.	Level III Basic (extended Basic)	$49.95
Data/Print	TRcopy (simple copy/backup of any tape)	$39.95
TSE	ST-80 (makes TRS-80 into intelligent terminal)	$49.95
	New DOS (improved disk operating system)	$49.95
	Text 80 (text editor)	$59.95
TBS, Inc.	System Doctor (diagnostic routine)	$28.50
Miller Microcomputer Services	MMSFORTH (Forth language; disk version has disk I/O and virtual memory)	$35.00 Tape $45.00 Disk
Discovery Bay Software	Autok & Qedit (Keyboard repeat and Basic editor)	$15.00

*Much of this software, particularly the higher priced items, can often be found for considerably less than the list prices by careful searching of magazine advertisements.

Figure 5

DEALERS

A.B.S.
P.O. Box 8297
Ann Arbor, MI 48107
(313) 971-1308

Alpha Product Co.
85-71 79 St.
Woodhaven, NY 11421
(212) 296-5916

Computalker Consultants
Suite A, 1730 21st St.
Santa Monica, CA 90404
(213) 392-5230

Cost Effective Computer Services
P.O. Box 3543
Grand Junction, CO 81501
(303) 245-0980

The CPU Shop
39 Pleasant St.
Charlestown, MA 02129
(617) 242-3350

Data/Print
Box 903
Fargo, ND 58107

Digital Dynamics, Inc.
310C Breesport
San Antonio, TX 78216
(512) 341-8782

Digital Research Corp.
P.O. Box 579
Pacific Grove, CA 93950
(408) 649-3896

Discovery Bay Software
P.O. Box 464
Port Townsend, WA 98368
(206) 385-4840

G.P.A. Electronics
P.O. Box 7410
Oakland, CA 94601
(415) 654-3898

GRT Corp.
1286 N. Lawrence Station Rd.
Sunnyvale, CA 94806
(408) 734-2910

Hobby World Electronics
19355 Business Center Drive
Northridge, CA 91324
(800) 423-5387

HUH Electronics
1429 Maple St.
San Mateo, CA 94402
(415) 573-7359

Ithaca Audio
P.O. Box 91
Ithaca, NY 14850
(607) 257-0190

Jade Computer Products
4901 W. Rosecrans Ave.
Hawthorne, CA 90250
(800) 421-5809
In Calif. (800) 262-1710

(Continued on Page 88)

DEALERS OF TRS-80-COMPATIBLE PRODUCTS

(Continued from Page 87)

Jameco Electronics
1021 Howard Ave.
San Carlos, CA 94870
(415) 592-8097

Michael Shrayer Software
1253 Vista Superba Drive
Glendale, CA 91205
(213) 956-1593

Microcomputer World
P.O. Box 242
San Dimas, CA 91773
(213) 286-2661

Micromation
524 Union St.
San Francisco, CA 94133
(451) 398-0289

Micro-Mega
P.O. Box 6265
Arlington, VA 22206

Microsoft
Suite 819, 10800 N.E. 8th
Bellvue, WA 98004

Miller Microcomputer Services
61 Lake Shore Rd.
Natick, MA 01760
(617) 653-6136

Mumford Micro Systems
P.O. Box 435
Summerland, CA 93067
(805) 969-4557

Organic Software
1492 Windsor Way
Livermore, CA 94550
(415) 455-4034

Parasitic Engineering
Box 6314
Albany, CA 94706
(415) 547-6612

Percom Data Company, Inc.
318 Barnes
Garland, TX 75042
(214) 272-3421

Priority One Electronics
16723K Roscoe Blvd.
Sepulveda, CA 91343

Programma International, Inc.
3406 Wilshire Blvd.
Los Angeles, CA 90010
(213) 384-0579

Quant Systems
P.O. Box 628
Charleston, SC 29402

Racet
702 Palmdale
Orange, CA 92665
(714) 637-5061

Small System Hardware
P.O. Box 366
Newbury Park, CA 91320

TBS, Inc.
P.O. Box 49104
Atlanta, Georgia 30359
(404) 939-6031

Telesis
P.O. Box 1843
Chillicothe, OH 45601

The Peripheral People
P.O. Box 524
Mercer Island, WA 98040

Tiny-C Associates
P.O. Box 269
Holmdel, NJ 07733
(201) 671-2296

Tora Systems, Inc.
29-02 23 Ave.
Astoria, NY 11105
(212) 932-3533

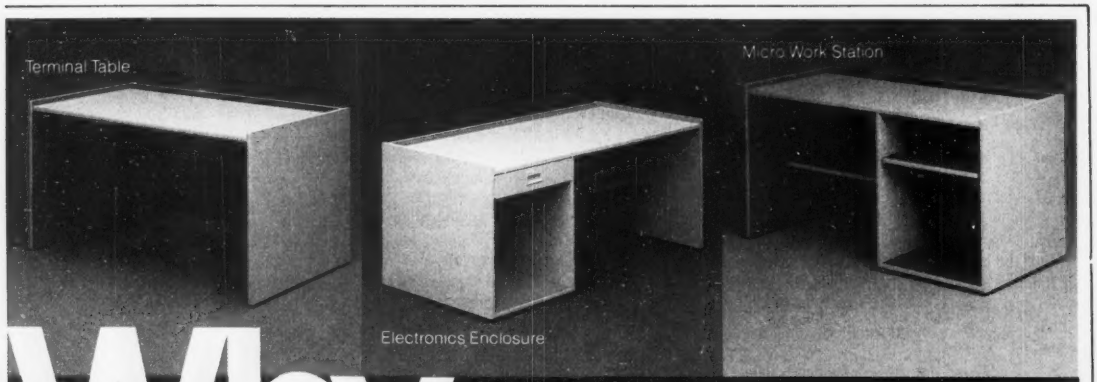
TSE
17 Briar Cliff Drive
Milford, NH 03055

Vista Computer Co.
Unit 1
1320 E. St. Andrews Place
Santa Ana, CA 92705
(714) 751-9201

V.R. Data Corp.
777 Henderson Blvd. N-6
Folcroft, PA 19032
(215) 461-5300

WEB Associates
P.O. Box 60-KU
Morovia, CA 91016

World Power Systems
1161 N. El Dorado Place
Tucson, AZ 85715
(602) 886-2537



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OKIYAMA:
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NCR's BOB SULLIVAN:
VRX (NCR's Virtual Resource Executive) is making a substantial contribution to increased productivity.

OKIYAMA:
We are using VRX to run our batch operations. VRX has cut our run time for these programs by 36 percent.

Yasuhiko Okiyama (left) is Vice President and Manager, Sumitomo Bank of California, San Francisco, the 92nd largest bank in the U.S. Bob Sullivan is an NCR district manager.

SULLIVAN:
Your online experience has been impressive, too.

OKIYAMA:
We have seen a 15.4 percent improvement in the handling of online transactions due entirely to the new generation hardware. And we know there will be another impressive jump in efficiency when VRX takes over the online operations. Under VRX, error recovery takes just seconds. With the old system, we needed a full minute.

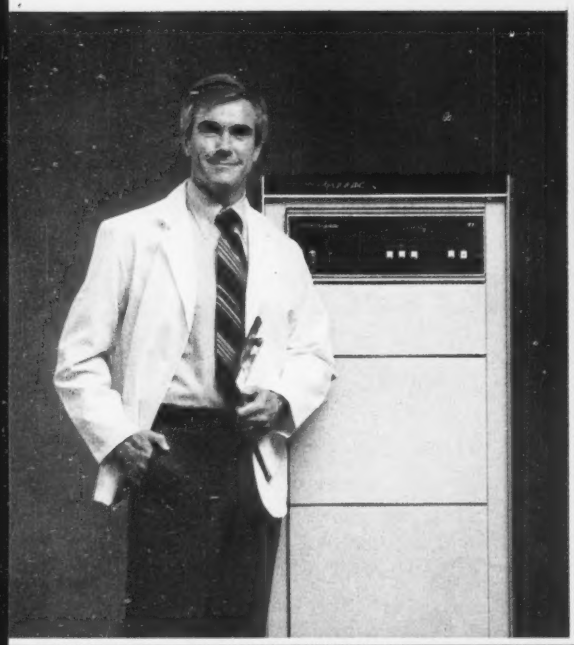
SULLIVAN:
VRX offers full dynamic resource allocation and virtual memory with no rigid memory partitioning. You can run up to 35 jobs simultaneously. And Sumitomo will soon be using Online Program Development (OLPD), a feature of VRX that multiplies the effectiveness of a programming group.

OKIYAMA:
Still, the most significant point I can make about this move from the last generation of NCR equipment to the next is that our old programs continue to run. We are making the transition easily because none of our software has become obsolete as a result of the change in hardware.

SULLIVAN:
That's NCR's Migration Path Engineering. One of our primary objectives is to provide easy alternatives for our users as the demands on their systems change. To eliminate dead ends. So that every user can upgrade gradually as his volume grows.

In the NCR office near you, there is an NCR account manager like Bob Sullivan who knows your industry and knows NCR systems, including VRX. To learn more about what an NCR system can do for you, phone him at your local NCR office. Or write to EDP Systems, NCR Corporation, Dayton, Ohio 45401.

NCR
Complete Computer Systems



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There's an optional new high speed 64-bit floating point processor that works in conjunction with a new globally optimized ANS '77 FORTRAN.

No wonder our three most important customers think so highly of it.

OUR OEM CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

The Miniframe is customer microprogrammable. So an OEM can implement his own firmware packages. And with the many software packages we offer, the OEM can add all the bells and whistles he wants.

The Miniframe comes with our largest instruction set ever. So OEM's with their own software have much more flexibility in design.

The Miniframe speaks PASCAL, the powerful new language for scientific, commercial, and system programming that most competitive systems still can't speak. And of course, it also speaks COBOL, FORTRAN and RPG II.

More good news is that the Miniframe is compatible with the rest of the V77 product line.

OUR SYSTEM HOUSE CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

Naturally, system houses want all the features OEM's do. And more.

So we gave them more.

More operating systems, for example. Choose from VORTEX or our new SUMMIT—an interactive, multi-terminal system with transaction processing and data base management. It gives you easy editing, screen formatting, and documentation aids. Plus speedy, comprehensive program development.

System houses also think PASCAL is important. Because it's more efficient, easier to maintain, expand, and modify.

The Miniframe brings systems builders a new query language called QL-77. It features inquire and report facilities. And interfaces directly to TOTAL®, the data base management system. So preprocessing and intermediate handling are a thing of the past. Finally, TOTAL also gives you complete data base access and file access security.

OUR END USER CUSTOMERS KNOW WE DESIGNED IT JUST FOR THEM.

Take all the features we designed in for OEM's and systems houses and say ditto for the end user.

But we didn't stop there. We also pressed a few special hot buttons just for end users.

Consider QL-77, for example. End users will love our new query language because it reduces the amount of application programming. By storing query language procedures right in the data base file. Where they can be easily and quickly recalled and executed at any time.

Once again, SUMMIT, our new operating system, helps the end user handle transaction processing. Without any additional, expensive software. It's also the right answer for a multi-tasking, "fully-implemented" distributed processing system.

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For more information, write to us at Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400, Marketing Communications.

In Europe, write Headquarters, Mini-Computer Operations, London NW10 8LS, England.

In Canada, write Headquarters, Mini-Computer Operations, 55 City Centre Drive, Mississauga, Ontario, L5B 1M4.

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SPERRY UNIVAC

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High-Technology Companies Advised:

Successful Firms Don't 'Seclude' R&D

By Marcia Blumenthal
CW Staff

BOSTON — Today's successful high-technology companies foster a partnership between key operating managers and the chief of research and development.

"In other words, in most successful high-technology firms, the corporate R&D lab is not a secluded place, kept at arm's length from the business," Dr. William P. Sommers emphasized here recently.

Sommers, president of the Technology Management Group at Booz-Allen & Hamilton, Inc., made these observations during an interview with *Computerworld* while on a short stopover to address a group of Harvard Business School students.

Sommers directed a recently completed study of how 12 leading high-technology firms actually manage their technologies. The study, done for General Electric Co., included three computer firms.

Besides the close relationship between the operating and research functions in these companies, Sommers also found top management in high-technology firms intimately involved in key commercial decisions.

One president of a large computer firm still makes decisions on which product development projects to fund, which to abandon, when to switch memory technology and when to commercialize, Sommers noted. In that company, management five or six levels removed from the chief executive officer acknowledged that he still made those key decisions.

The Booz-Allen & Hamilton study was conducted between February 1977 and May 1978 by a team that spent three to six days at each company interviewing managers at all levels to assess specific technology management methods used and the measurement of their results.

Dr. William P. Sommers

While top executive decision making was evident in these companies, Sommers was equally impressed with R&D executives' understanding of the company's near-term business objectives.

Successful technology managers are very conscious of who the company's leading

(Continued on Page 94)

CPU Moves by Rail Studied

By Marcy Rosenberg
CW Staff

READING, Mass. — The tight supply and escalating price of diesel fuel led industry and government to jointly investigate the economic and safety aspects of moving computers by rail, and the study, "Test Results Report for Computers by Rail Piggyback Evaluation Program," is scheduled to be released within 30 days.

The report represents a collective investment of more than $150,000 by the Federal Railroad Administration, Digital Equipment Corp. and Data Transportation Co., Inc., a Bekins Co. subsidiary.

Data Transportation, which reported $10 million in revenues last year, specializes in moving high-technology electronic equipment, a business that currently accounts for 15% of Bekins' gross revenues; the remainder comes from shipping household goods by van or air.

At a meeting here, the Bekins subsidiary revealed some preliminary report results which it feels will testify to the cost benefits and safety of transporting computer equipment by piggyback rail — that is, where regular trucks or trailers are placed on railroad flat cars.

Diesel Fuel up 23.6%

The advantage of moving computers by rail instead of by van lies mainly in its potential to save on diesel fuel costs, which have risen about 23.6% in eight months, according to Lee Waters, president of Bekins Transportation & Warehousing Group.

Based on Bekins' bimonthly poll of 10 to 15 truck stops in each state, Waters said diesel fuel prices jumped from 59.8 cents a gallon in September 1978 to a nationwide average of 73.9 cents this May. About 99% of the long-distance trucks on the road use diesel fuel and average 4-1/2 to 5 miles to the gallon, he added.

While most locomotives are also powered by diesel fuel, Waters explained they have greater fuel storage capacity — some 3,600 to 4,000 gallons per tank — and can move three to four times more gross ton miles per gallon than can highway trucks — where one gross ton mile equals the vehicle plus its cargo moved one mile.

Another advantage of rail over truck freight in a fuel crunch is that diesel locomotives get their supplies from railroad-owned

(Continued on Page 94)

Suggestion for Mini Vendors: Aim at Specific User Needs

By Harmon Houghton
Special to CW

Suggesting that many medium-size companies fail to appreciate the benefits of minicomputer technology, the author urges vendors and concerned consultants to offer prospective mini users more information about the systems available to them and the ways they can be evaluated.

For the management consultant serving the medium-size company, the minicomputer has become a fact of life. Just a decade ago, computers were priced out of reach of these companies. Today, the benefits they bring are within reach of all.

However, it is necessary to realize that minicomputers are themselves not magical tools. Much of their effectiveness depends on the wisdom and common sense that is brought to their application.

Our experience in working with the owners and managers of these medium-size businesses has revealed a number of common factors that, if understood, may help to clarify the ambiguities and perhaps enable the truly impressive number of companies in this middle market to bring promise and performance in line in their minicomputer applications.

To realize the potential of the minicomputer, it is first necessary to realize the full

(Continued on Page 92)

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Supershorts

Siemens AG and Rockwell International Corp. entered into a second-sourcing agreement covering production and marketing of both firms' bubble memory devices and subsystems. As part of the agreement, the Siemens Components Group in Germany will produce Rockwell's 256K-bit bubble memory device and related subsystems.

– – –

McGraw-Hill, Inc., has acquired the capital stock of Adam Osborne & Associates, a publisher of books for personal computer users. The agreement marks McGraw-Hill's second acquisition in the personal computer field; the firm purchased *Byte*, a consumer magazine, in April.

Computer Sciences Corp., which operates the Infonet international remote computing service, has acquired for cash another remote DP service firm, CMS Industries, Inc., that serves the distribution industry.

– – –

Microdata International Corp. has entered the Far Eastern market by signing Kyokuto Boeki Kaisha, Ltd. to distribute Microdata's Reality small business computer systems in Japan.

– – –

In a major reorganization, Datapoint Corp. created a Data Processing Group and three new divisions: Small Systems, Large Systems and Peripheral Operations.

Mini Vendors Should Aim Marketing at User Needs

(Continued from Page 91)

range of its capabilities. Certainly not every user will need to use this full range, but there are many instances where, once the minicomputer has been installed, other applications for its use are discovered.

Therefore, the place to start is with an outline of the jobs the company would like to have done in the optimum circumstances. Then, the company must search for a minicomputer that will perform these jobs within the cost and operations parameters set by the company.

Inevitably, some adjustments in expectations will have to be made. Not all minis do all jobs equally well. Some are more effective in one area, others perform better in another. The criterion here must lie within the needs of the prospective purchaser.

If there is one attribute shared by owners and managers of medium-size companies, it is a belief that "we are special." If they are going to invest in a system that represents a major change in their operations, they want to be assured that it is "just right for us."

Philosophically Vague

The manufacturers and distributors of minicomputers should address this very real concern. Often their literature, while technically detailed, is philosophically vague. The medium-size business audience could probably do with less technical detail and more market-directed literature prepared for special categories of users and based on a real understanding of the needs and problems of each category.

Companies considering minicomputers want to know how much they will need to change their procedures — and most times, the answer is very little indeed. They want to know if they can continue to use their own personnel or will need to hire specialists — and again experience shows that regular office personnel rapidly become minicomputer operators with ease.

Medium-size businesses want to know what will happen if "downtime" occurs — and again there is the alternative of reverting to traditional procedures until the computer is operational once more.

The management consultant can do his part in introducing the client to this new world of time- and cost-saving and information. It is also a job in which the minicomputer industry must participate more forcefully.

A good communications program, informing prospective users of the many ways in which the minicomputer can aid their businesses — and at the same time preserve the way of life so dear to the American entrepreneur — would do much to allay fears. The businessman has legitimate questions about the role of the minicomputer in his business — and the minicomputer industry has the answers. An information gap does exist, but it can be readily bridged with an industry-sponsored informational effort.

Houghton is president of Computer Assets Corp., a division of Houghton Management, 140 E. 46th St., New York, N.Y. 10017.

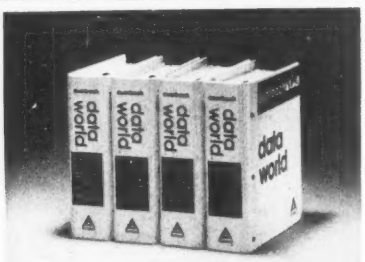
Newsletter Explores DP Business Options

MEMPHIS, Tenn. — New to the newsletter scene is *Computer Opportunities*, aimed at the enterprising computer professional.

The monthly newsletter, published by Datasearch, Inc., focuses on promising business opportunities for entrepreneurs in systems houses, dealerships, microcomputer enterprises and contract programming.

In addition, the six-month-old newsletter contains how-to information on starting a computer business, the publisher said.

Yearly subscriptions are $36 from Datasearch at 4954 William Arnold Road, Memphis, Tenn. 38117.



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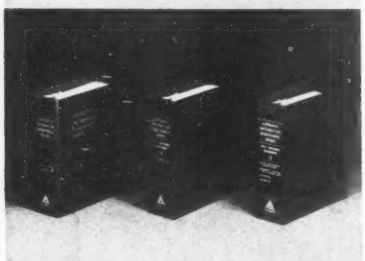

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CW

GTE: Merger Conditions Thwart Competition

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Telenet Corp. will not be able to compete effectively in the U.S. telecommunications market under the conditions imposed on its merger with General Telephone and Electronics Corp. (GTE), according to GTE Chairman Theodore F. Brophy.

Brophy told the Federal Communications Commission (FCC) May 31 that the 10 conditions set forth by the commission in its May 2 approval of the merger "go beyond what is legitimately necessary to satisfy the concern of the other parties" in the proceedings.

The FCC is reconsidering those conditions [CW, June 6].

Separate Subsidiary

The 10 conditions provide that GTE operate Telenet as a wholly separate subsidiary [CW, May 14]. The conditions reflect the commission's concern about the anticompetitive effects a combined GTE-Telenet corporate entity might have on the domestic communications industry [CW, March 5].

Unless the conditions are relaxed, Brophy said Telenet would not have adequate access to the financial and technical resources that Telenet needs to compete with such offerings as AT&T's Advanced Communications Service (ACS).

Telenet Chairman Lawrence G. Roberts backed the claim, saying Telenet would be restricted from making use of the communications and electronics expertise already available from GTE. As currently framed, these conditions would deprive Telenet of any of the advantages it foresaw in the merger, Roberts told the commission.

Brophy said that under these circumstances, he could not recommend the merger to GTE's board of directors. Proposing a number of revisions to the conditions, Brophy urged the commission to act quickly, claiming there has been "serious deterioration in the financial situation of Telenet" during the six months the merger has been debated before the FCC.

Graphnet, Tymnet Demur

Representatives of Graphnet, Inc. and Tymnet, Inc., however, countered Brophy's argument by asserting the merger conditions are necessary because the FCC never held full evidentiary proceedings to determine the merger's effect on the marketplace. Graphnet counsel Edward P. Taptich also argued that GTE and Telenet have produced no new information on which the commission might base a relaxation of the conditions.

Taptich said that because AT&T is having problems developing ACS, Telenet does not need immediate financial backing to prepare to compete with that offering. The commission should take advantage of the "rather dramatic change in the circumstances giving rise to the truncated proceedings" of the last six months, he said, and take a closer look at the merger requests.

According to Brophy and Roberts, however, the delay is already adversely affecting Telenet. Brophy said GTE has loaned Telenet $1.5 million to keep it going until the merger can take place, and Roberts claimed its company is losing employees and customers because of the uncertainty of its future.

Orders & Installations

Uniontown Newspapers, Inc. of Uniontown, Pa., has acquired TMS-11 and TABS-11 systems from Digital Equipment Corp. The systems will assist management of editorial, classified advertising, production and business procedures for the newspapers.

Commercial Lovelace Motor Freight, headquartered in Columbus, Ohio, has ordered a Univac 90/60 system to be used for message switching, equipment inventory control and on-line order entry.

Thrifty Corp. has ordered 750 MSI/88 hand-held data entry terminals from MSI Data Corp. The systems will be used for electronic ordering by the Thrifty Drug and Discount Stores chain.

The Interbank Card Association has ordered DP equipment valued at $4 million from Northern Telecom Systems Corp. The order is for a minimum of 100 Data 100 Model 78 remote batch systems to support credit card transactions.

The Phoenix Group, a wholesale supplier of systems and peripherals, has ordered a Model 704 data communications printer from Centronics Data Computer Corp.

The U.S. Naval Electronics Systems Command has ordered $5.8 million worth of Model AN/UYK-20 systems from Univac.

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- *When does an organization go to a DDP network?*
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- *What are the potential drawbacks of having more intelligence and autonomy in the field?*

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Executive Corner

• William S. Ang has been appointed chief engineer and G. Richard Wallmann was named director of software development at Rexon Business Machines Corp.

• Savane Santana has been promoted to vice-president at Pansophic Systems Pan American, Inc.

• Frances Pierce, Alfred Antos and Thomas Shaeffer have been elected vice-presidents at Data Systems Analysts, Inc.

• Howard A. Thrailkill has been promoted to head of computer systems at Harris Corp.'s Computer Division. Thomas E. Brimer will succeed Thrailkill as vice-president and general manager of composition systems.

• Manufacturing Data Systems, Inc. has made three executive appointments within the company. Appointed a senior vice-president is Charles S. Hutchins; appointed vice-presidents are Dr. Barry R. Borgerson, vice-president of research and development and Jack L. Manes Jr., vice-president of human resources.

• Leland M. Cole has been named vice-president of international operations for Sentinel Computer Corp.

• Peter A. Highberg has been named assistant vice-president for the Computer Division at SCI Systems, Inc. Highberg will be corporate officer for SCI and responsible for the terminal department.

• Chuck Canon has been promoted to vice-president of customer service at Microdata Corp.

• Wilfred J. Houde has been appointed director of service operations at Apple Computer, Inc.

• James E. Alexander has joined Pertec Computer Corp.'s Computer Systems Division as national marketing manager.

• Paul B. Silverman has been appointed manager of business development and regulatory affairs for Xten, a subsidiary of the Xerox Corp.

Joint Study Evaluates Feasibility Of Transporting CPUs by Rail

(Continued from Page 91)
storage facilities and therefore are not subject to regional allocations, he said.

Safety Issues

But to sell computer manufacturers on rail transportation for their expensive, high-technology equipment, researchers realized they had to address safety and handling issues.

Therefore, a part of the study conducted by a consulting firm, Ensco, Inc., measured both shock — or severity of vibration — and frequency of vibration transferred from the rail flat cars to the trailers for two 260-mile test runs from Boston to Mechanicville, N.Y. Tests were done at different speeds and track conditions.

The results showed that while G-readings, a measure of shock, came in high at a maximum of 5, vibration frequency measured only as high as the low 60-Hz range — or lower than in highway situations.

This low frequency of vibration makes a ride safer, Waters said, because it minimizes the chance of metal fatigue in delicate parts which can cause them to shake loose.

After moving the initial test loads by rail, Data Transportation "started to get some revenue loads from DEC," according to Terry Tuttle, area sales manager and an original designer of the study.

Noting that DEC was the company's best account in the past few years, he said, "we let DEC jump the gun," but added that after public release of the report, other firms will be able to take advantage of the piggyback rail system.

Data Transportation is confident that the results of this two-year project "will give us something acceptable to railroads and present us with a viable transportation mode to take to equipment manufacturers."

The firm, based in Los Angeles, transports equipment ranging in value from $25,000 to $500,000 for most of the major computer manufacturers, though not all on an exclusive basis.

Customers include Burroughs Corp., Honeywell, Inc., Hewlett-Packard Co., Amdahl Corp., DEC, Microdata Corp., Datapoint Corp., Wang Laboratories, Inc., Decision Data Computer Corp. and Xerox Corp.

Close Ties Between Operating, R&D Areas Seen Key to Success

(Continued from Page 91)
edge customers are and use the views of these customers in directing the way future products are produced and offered to the rest of the company's customers. "Technologists are out in the marketplace," Sommers stressed.

In the past, most companies have appointed their top technical person to the post of technology executive as a reward. Sommers warned this is a mistake in today's high-technology environment, which increasingly must be hinged to marketplace realities. The management of technology in the most successful technology-based firms has become a top executive function.

With product life cycles shortening, the planning horizon has likewise been shrinking, with two to three years now considered long-range planning. Only three of the 12 companies surveyed engaged in planning beyond a 10-year range, Sommers said.

Market Demands

To compete successfully in today's fast-paced market, companies must be able to introduce their products quickly and cost effectively.

Both of these market requirements affect the operation of high-technology firms. To be an early market entrant, the company must have a rigorous method of getting the product out of the lab and to the user. The phases of product development must be highly defined and structured — "the plain old garden variety of product management," Sommers said.

Successful high-technology companies make liberal use of the matrix organization structure, using product managers as mini-general managers, he said.

Regardless of when the product is commercialized, it is becoming increasingly important for companies to cap manufacturing costs. The return on investment on developing process technology is "More predictable and at least as attractive as that for new products," Sommers observed.

Although closely controlled product and manufacturing management is essential to success in the high-technology marketplace, the companies surveyed generally had an entrepreneurial spirit. "We did not expect to see this," Sommers said.

Some firms offer technologists a risk-free environment in which to experiment, yet many technical managers said they thought minimizing non-directive R&D was squelching a firm's ability to innovate.

Most companies offered bonuses or awards for individual technical achievement. One company noted that "these awards were made to assure that marketing and financial people remember why the company is in business."

Technologists on Board

A means of recognition still to be developed extensively in the U.S. is electing technology executives to the company's board of directors. This allows the top technologist to stay within the mainstream of his area of expertise yet achieve status within the company. Japan seems to be far ahead of U.S. companies in using board membership as recognition, Sommers concluded. Three companies participating in the survey were Japanese firms, one a computer firm.

To further success in the marketplace, Sommers thinks technology companies must segment their markets more thoroughly while assuring the transferability of technology across market lines.

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COBOL, FORTRAN, BASIC
Interactive Information Systems
Quantitative Analysis
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IBM 360/360 OS, VS

- **DATA BASE ANALYSTS**

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Systems Analysis
Project Leadership
Information Systems Implementation
Knowledge of Time Sharing Usage

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Applicants should have experience in maintaining, modifying or extending any of the following operating systems:

- **CYBER 17X, 6000 or other large systems with NOS, NOS/BE, SCOPE, KRONOS, or OS**

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(Opportunities in Albuquerque, New Mexico)

- **System 370, 360 or OMEGA with DOS, VS1, VSII, SVS or MVS**

(Opportunities in Dallas, Detroit, Kansas City, Los Angeles, Minneapolis, New York City, Pittsburgh, Seattle and St. Louis)

- **CYBER 18 or other minis with 1700 MSOS, RCOS, ITOS or OS**

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or have extensive assembly language on any of the above computers.

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John N. Powers at the address below

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  Assist our customers and field personnel in the installation and use of our online program development system for OS. This position encompasses all levels and areas of technical and sales support. Applicant should have a background in customer relations; require a minimum amount of supervision; be motivated, imaginative and personable. Knowledge of ROSCOE, previous experience in software product support or a strong BAL background a plus. Light travel.

- **The LIBRARIAN**
  Assist customers in the use of our source program management system. With the development staff, take part in the analysis and solution of reported problems. Requires knowledge of The LIBRARIAN, BAL, DOS/VS JCL and POWER/VS JECL. Knowledge of COBOL a plus.

- **LOOK**
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Sales of Wang's multi-terminal interactive virtual memory computer systems are growing significantly. Due to this success, we have an immediate need for several marketing professionals to join our home office computer marketing group.

A degree and a minimum of four years' involvement in the selling/marketing of computer systems required. Responsibilities include the formulation and implementation of marketing strategies, conducting sales and prospect seminars and supporting Wang's sales force in the marketing of stand alone and distributed computing systems to commercial accounts. These are high visibility positions in one of the world's fastest growing industrial corporations.

D.P. Competitive Analyst

This is an opportunity for an individual with the ability to quickly understand and interpret competitive products, then communicate this interpretation both verbally and in writing. You should have detailed knowledge of minicomputer systems for distributed processing and word processing. Working knowledge of operating systems, languages and hardware technologies is necessary. Specific knowledge of IBM, Data General, HP, and/or DEC will be a plus.

We offer excellent salaries and benefits. Please send resume, including salary history, to Mark Camp, Professional Recruiting, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851.

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Although the growth potential in the energy management marketplace alone certainly appears to be unlimited, the capability of this group also encompasses considerably broader systems applications, also on a turnkey basis, including the entire spectrum of factory and facility needs for real-time data acquisition, processing and control.

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Software project engineers are urgently needed to help produce functional designs for new software and modifications of existing packages; to monitor the development of design and implementation of control system software; to participate in and direct system data base and graphics development; to provide technical software liaison with customers; to support in-house and field checkout and acceptance of total system.

Hardware project engineers should have a BS in engineering or considerable practical experience involving projects relating to instrumentation systems, real-time data gathering systems, or HVAC systems.

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Our clients, with locations in virtually every state in the U.S.A., need programming, software, hardware/software and engineering personnel to satisfy this demand for your expertise which is at an all-time high. OEM applications include systems architecture development, systems performance requirements and specs development, hardware/software performance and design, data base design, diagnostics, compiler design, system integration of new software releases, design tradeoff evaluations, etc. User real-time environments include process control, engineering, communications, engineering, military, graphics, simulation, modelling, etc. using virtually every kind of hardware (DEC, Data General, Interdata, Hewlett-Packard, Honeywell, IBM, Varian, Datapoint, Wang, Four-Phase, Raytheon, Taylor, Foxboro, etc.) Salaries range from $18-40,000.

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Requires a BS in Computer Science and 2-4 years experience in mini-computers, including operating systems and the ability to use assembler languages. Software product Assurance and/or Performance Measurement experience desirable. Responsibilities will include testing and assuring that our new software products meet all specifications, performing measurements and analysis of current and new software products, and supporting qualification sites for acceptance and assurance of products.

OPERATING SYSTEMS DEVELOPMENT

Requires a BSCS/BSEE with 3-5 years experience in design and implementation of data communication software in an operating systems environment. Knowledge of high language levels a plus. Experience with line and network protocols desirable. Will design and implement various modules of new data communication driver processors.

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Requires a BSCS/MSCS with minimum 3 years experience in mini-computer on-line interactive/operating systems development and file system development. Knowledge of mini-computer systems programming with assembly language and PASCAL desirable. Will design and implement modules within the ICS on-line interactive/operating system.

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Requires a BSCS or comparable background and 4 years experience with operating systems and assembly language. Knowledge of compiler level langauges and experience with mini-computers, as well as marketing and customer interface are definite pluses. Light travel required.

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Requires a BSCS or equivalent with a minimum of 5 years mini-computer experience. Knowledge of compiler development maintenance helpful. Responsibilities will include maintenance enhancement of language processors (e.g. COBOL, RPGII, PASCAL) and operating systems.

SOFTWARE ENGINEERS

Two positions available requiring BSCS or Math. One position requires minimum of 9 years experience and the other a minimum of 6 years in software development with knowledge in software quality assurance. The senior level candidate must have the ability to assume project leadership, and both must be able to prepare technical and administrative reports. Customer contact or user experience desirable. Responsibilities will include defining standards and procedures for software quality, test plan preparation and project coordination.

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Requires a BSEE or Computer Science or equivalent and minimum of 2 years in micro diagnostics with software and hardware background. Responsibilities will include development of micro diagnostics (CPU, Memory) and on-line system diagnostics for computing systems.

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Candidates must have a minimum of 3 years heavy data processing audit experience, including exposure to large scale processing environment with on-line features and data bases, and 4-5 years in Data Processing, System Analysis or Programming. Good interpersonal skills and ability to communicate effectively essential. College degree preferred.

Salary commensurate with qualifications and experience.
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Must have 1-3 years of applications programming and experience with OS or VS operating systems. Prefer 2 years of college plus experience with MVS operating systems and/or teleprocessing systems.

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Immediate openings exist in our Market Development Group for seasoned marketing professionals who possess a solid applications background in the information processing field.

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WANG

Word Processing

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Our MIS Planning Department is responsible for developing corporate-wide strategic long-range MIS plans, establishing a long-range MIS planning methodology throughout the firm, and assisting management at operating units in preparing MIS plans.

The qualified candidate will participate in and provide leadership to MIS strategic planning projects, and will act as an internal consultant to executive management in the preparation of long-range MIS plans for the company's 45 divisions. The candidate will receive broad exposure to a full range of MIS and operating management activities and will have an opportunity to participate in major corporate decisions.

We are seeking a college educated individual who has management and/or consulting experience in machinery or chemical manufacturing, a good knowledge of MIS applications, and the ability to work closely with executive and operating management. An MBA and experience in long-range MIS planning would be desirable.

senior manufacturing systems analyst

Our Manufacturing Systems Department is developing and implementing a corporate-wide manufacturing systems plan which will be second to none in the industry.

The qualified candidate will coordinate the development and implementation of our manufacturing control systems at as many as 12 operating units at one time. He will assist top corporate and divisional management in developing a specific plan for each manufacturing installation.

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These positions are immediately available as a result of a newly funded, multi-year program. The program goal is to provide a more controlled and effective MIS environment through the proper utilization of software, hardware, and human resources. Bright and energetic individuals are needed for the following positions:

Control Consultant

A highly qualified individual is needed to be responsible for identifying, analyzing, developing and finalizing MIS control policies, directives and standards. You will monitor measures to provide a more controlled MIS environment, actively participate and/or lead planning activities directed at the development of measures affecting MIS groups or remote sites, and perform project leadership. Ideal candidates will have at least 5 years' experience in at least 2 of the following: application systems development using COBOL or PL/1, systems programming, or computer operations. You should also have exposure to IBM 370/158 VM or 168/MVS computing systems, TSO or equivalent time sharing capability, and distributed computing using SyFA or equivalent minicomputer systems. Related college degree or equivalent highly desired.

Software Consultant Distributed Systems

If you're motivated by a strong interest in state-of-the-art methodologies, software and hardware, this could be the ideal opportunity for you. You will be responsible for creating software and/or procedures to improve productivity and effectiveness. Will assist in hardware evaluation, design and perform benchmarks for system test. You will also present in-house seminars and be responsible for supporting and writing distributed systems software. Extensive experience in implementing, maintaining and modifying large and/or complex distributed processing computer systems is required, including Assembler/Machine or SYBOL language background.

Senior Applications Programmer

You will provide application programming resource to enable MIS groups to implement backup and recovery measures. Experience in designing, implementing and modifying large computer systems and a thorough knowledge of VS/ANSI COBOL and/or Optimizer PL/1, IBM OS/VS JCL and TSO are required. Comprehensive knowledge of the improved programming technologies, and basic knowledge of database and on-line system concepts are also needed.

D.P. Research/Consulting

A challenging position with variety and visibility could be yours if you qualify for this internal MIS position. You will be responsible for researching, analyzing and developing internal MIS techniques, policies, and methods in conjunction with top management. The ideal candidate will have experience in most of the following areas: systems analysis/programming, EDP security and audit controls, database concepts, COBOL, PL/1, MARK IV, IBM OS/VS, distributed systems and system development methodologies.

Data/Resource Administrator

We need a top administrator to assist with the implementation of a resource access system and backup/recovery procedures, process requests for access to data or resources, and investigate/resolve exception conditions. 2 years of college-level coursework or equivalent experience and 2+ years as an applications or systems programmer in an IBM 370 MVS environment are needed to qualify. Familiarity with JCL and TSO highly desirable.

Production Certification Specialist

Administrative and organization skills are a must for this key position. Responsibilities will include assuring: the accuracy of computer programs passing from development to production, adherence to standards, and backup and recovery. Duties will also include providing change control function for modifications, maintaining central program documentation files and performing production installation procedures. 2+ years of college-level coursework or equivalent experience required. Data processing experience, specifically JCL and job scheduling preferred.

If you have the qualifications we seek — if you're looking for optimum challenge and visibility — and if you're good where you are, you'll be great at Fairchild.

And at Fairchild, we firmly believe that the better you know us, the more likely you are to choose us. So spend a few minutes calling (415) 962-3570 and we'll get back to you with some inside information on starting a career with the company that started so much in electronics technology and employee benefits.

If you can't call, send a resume or letter outlining your background to Dana Tueller, Fairchild Professional Staffing, MS 7-100, 464 Ellis Street, Mountain View, California 94042.

At Fairchild, we're proud of our efforts as an affirmative action employer and we encourage women, members of minority groups and the handicapped to apply.

Openings in Mountain View, California.

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We started it all.

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At Honeywell, people are the basis of our success. Their intelligence, energy, judgement and creativity are the critical resources we rely on in the continuing expansion of our computer business.

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Stephen G. Jerritts
Vice President & General Manager, USISG

I am pleased to announce that "The Search Is On" generated an overwhelming response, and brought us approximately 1500 highly qualified professional employees who are now working at our locations throughout the United States.

1978 was the most successful year ever for Honeywell, and there is no question that our people gave us a competitive edge.

As we look forward to the 1980's, Honeywell's U.S. Information Systems Group and its component organizations will continue to grow and will focus increased attention on addressing the computer needs of specific industry markets. Our business will continue to grow and provide attractive career opportunities to dedicated professionals... professionals who understand that software and hardware must answer the customer's needs... professionals who think of computers as means to problem solving, not as ends in themselves. And most importantly, people who think in terms of interest and opportunity and are not threatened by it. These people will create the competitive edge for Honeywell — and for themselves.

Made Successful.

Marketing and Services Information Systems Division

Headquartered in Waltham, Massachusetts, MSISD is responsible for the sales, installation and service of Honeywell's full line of computers in the United States. Rewarding opportunities are available for computer professionals with experience in sales, systems support, field engineering and product/industry support in most major cities throughout the country.

Small/Medium Information Systems Division

Our Small/Medium Information Systems Division is headquartered in Billerica, Massachusetts and has facilities in the nearby communities of Brighton and Lawrence. We develop, manufacture and support our growing family of Level 6 systems, VIP Terminals and peripherals for worldwide distribution. Our Division also directly markets these products to OEM and Systems Builder resellers.

In addition, our charter includes importing and staging Honeywell's medium scale computers, the Level 62 and 64, from our European affiliates.

Opportunities are available at most levels and in all disciplines of Marketing, Software Development, Computer Design/Development, Production and Production Support at our facilities in Billerica, Brighton and Lawrence, Massachusetts.

Large Information Systems Division

LISD, with facilities in Phoenix, Los Angeles and Cambridge, Massachusetts is responsible for Honeywell's large computer systems business. Opportunities are available for creative and dedicated hardware and software engineering and production professionals to help create the next generation of Honeywell's state-of-the-art large systems.

Incoterm

A Honeywell subsidiary headquartered in Wellesley Hills, Massachusetts, Incoterm is a pioneer in the development of intelligent terminals. Today, as one of the world's leading suppliers of large on-line interactive distributed data processing systems, Incoterm can offer excellent opportunities in hardware and software engineering, manufacturing and marketing.

Headquarters USISG

Located in Waltham, Massachusetts, USISG Headquarters can offer outstanding opportunities to professionals with experience in: Management Information Systems and Finance.

Whatever your expertise, the probability is that your career goals may be consistent with Honeywell's current and long-range plans. Why not forward your resume or fill out the coupon and direct it to the appropriate following individuals.

MSISD
Al McCarthy
HONEYWELL
BM 700
200 Smith Street
Waltham, MA 02154

INCOTERM
Bob Van Ness
INCOTERM
BM 700
65 Walnut Street
Wellesley Hills, MA 02181

S/MISD
Lou Sinagra
HONEYWELL
BM 700
300 Concord Road
Billerica, MA 01821

HEADQUARTERS USISG
Dorothy States
HONEYWELL
BM 700
200 Smith Street
Waltham, MA 02154

LISD
Charlie Hull
HONEYWELL
BM 700
Box 6000
Phoenix, AZ 85005

NAME _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

PHONE _____

AREAS & YEARS OF EXPERIENCE _____

_____

POSITION (S) OF INTEREST _____

BM 700

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Our Competitive
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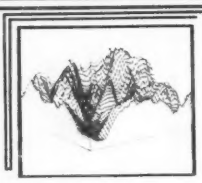
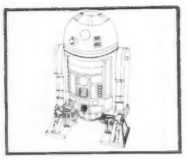
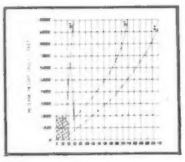


Systems Analyst

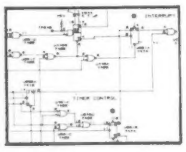
...Your Experience in Computing could lead to a rewarding career in sales support at Tektronix!



Our continued expansion allows us to offer an exciting career position to a talented Systems Analyst with proven experience in sales support or a strong desire to become actively involved in the sales environment.



You will work in support of our sales engineering group in either Hampton, Va., Pensacola, Fl., Pittsburgh, Pa., or Washington, D.C. Your duties will include: providing technical assistance to customers, computer graphing and interactive graphics consultation, and customer training in hardware/software and applications. In addition to technical knowledge, you should possess excellent written and verbal communication skills. Your background should include experience in using timesharing systems, data communications and FORTRAN programming. A college degree is preferred.



We can offer you an excellent salary, complete benefits, and outstanding advancement potential with a strong, growing company.

For confidential consideration please contact George Evans at TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850, or call TOLL FREE at (800) 638-4052.

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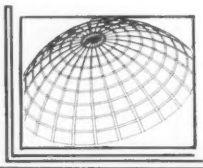

Tektronix
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SPCommunications provides a common carrier Telecommunications System linking over 60 Metropolitan Areas. Our coast-to-coast network of microwave relay satellite and switching systems provides voice, data and facsimile transmission services to the Business Community.

SPCommunications has compiled a record of growth and achievement that translates into impressive numbers — 100% growth per year ... 2,000 new customers a month ... and DOUBLING THE SIZE OF THE MIS DEPARTMENT in 1979!

These numbers are important — but not as important as the people at SPCC. We recognize that it is our Professional Staff and Managers who are responsible for SPCC's growth and we make very sure that they are rewarded every appropriate way.

We are currently developing a new Data Center with a 6 meg 3031, OS/VS1, VM, JES1, DB/CICS and CMS. We have exciting new development work to do in the Marketing, Financial, Network Operations, Engineering and Billing areas and need your help.

If you have a minimum of 3 years large scale IBM experience, COBOL and on-line data base, please contact us by phone or resume and give us a chance to explain in greater detail the opportunities available.

SPCommunications rewards individual initiative with excellent salaries and benefits including full relocation and Company Paid Health, Dental and Life Insurance.

Our highly desirable San Francisco Bay Area location is ideal for you and your family and offers an exciting range of social, cultural and recreational activities.

Contact Deana St. John at (415) 692-5600, or rush your resume to SPCommunications, One Adrian Court, P.O. Box 974, Burlingame, CA 94010. An equal opportunity employer M/F.

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Computer Professionals

San Francisco Bay Area

The living is good here, but only if the work meets your expectations. It is our purpose to show you only those positions (over 700) that meet your specifications. Our Bay Area clients will relocate highly experienced career oriented professionals. A sample of current openings are:

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Manage the development of highly sophisticated computerized manufacturing systems. Requires strong experience in manufacturing applications. Knowledge of AMAPS helpful.
Salary to $50,000

Data Base Administrator

Requires strong technical knowledge in IMS and the ability to communicate well with upper level management. Ideally, you will have performed in this capacity and will have been involved in a data base conversion.
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EDP Consultant

This prestigious San Francisco consulting firm needs exceptional commercial systems analyst to consult on a wide variety of assignments. Duties will range from feasibility studies to hardware evaluation to detailed systems and programming design and implementation. Appropriate experience is required.
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Minicomputer Programmer Analyst

Be involved in the design and implementation of a distributed minicomputer network. Requires assembler language programming on minicomputers and knowledge of communications software.
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Many other programming and analyst positions available.

Call collect, come in, or forward your resume to
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PROGRAMMER ANALYST

Development and Maintenance In Active Systems Growth

A challenging position is waiting for you with Phelps Dodge Brass Company. We are an important manufacturer of fittings and valves for the plumbing industry. We're now engaged in vigorous development of our state-of-the-art systems capability, and we're seeking an individual with at least 3 years' experience in a System/3 environment working with RPG II. A background in BOMP or CCP is desirable. You'll be taking responsibility for our systems development and maintenance.

We think you'll like our location. Anniston, Alabama, is a city that knows about the good things in life, with plenty of room for your favorite sport — lakes and rivers for hunting and fishing, 3 golf courses, and so much more. Culture and the arts are at home here, as anyone who's seen our Shakespeare Festival will tell you. From outstanding architecture to low cost of living, you'll find a world of reasons to like Anniston. And it's convenient to Birmingham and Atlanta.

The professional challenge at Phelps Dodge Brass is rewarding in itself, and you'll also find that we offer a good income with excellent benefits, including company-paid life insurance, family hospitalization, profit-sharing, retirement and stock ownership plans.

For immediate consideration please send your resume in confidence to:

Data Processing Manager

phelps dodge
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When P.P.S. places you in your next position, we will send you to Europe, for one week, all expenses paid. If you refer us a candidate we place, we'll send (2) on the same tirp. Our immediate needs are:

1) IMS/COBOL Development
2) CICS COBOL/Assembler/PL-1
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4) Assembler Language

These positions are for Dallas, Atlanta, Houston, Phoenix, San Francisco, and some cities of 100,000. Please send a resume or letter of interest. We will return pertinent information on your geographic preferences.

Professional Programming Services, Inc.
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P.S. We have permanent and contract-hire long term consulting positions available for OS, COBOL, and/or data base professionals. If you've ever wondered what TRUE consulting is all about, please contact us! Top financial renumeration package.

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A combination of technical excellence and marketing know how has put us in the forefront of the highly competitive field of communications management. To maintain our leadership position, we are trying to locate talented sales professionals for major markets from coast to coast.

INFOSWITCH puts you out in front!

You should have those rare qualities of enthusiasm, aggressiveness and integrity that are the mark of a top sales representative. In addition, you should have a degree and a proven record of success in selling data processing, communications or office equipment.

If you do, we can offer you complete product training, excellent home office support, innovative products, and a compensation plan that ranks with the best in the industry. If you are the type of successful person we are looking for, you probably do not have a current resume. Please call one of the following to talk about your future with Datapoint.

Eastern Region	Jim Brennan	212/826-9518
Central Region	Pete Piper	312/298-1070
Western Region	Bill Coleman	415/572-1370
Southwestern Region	Len Julius	214/661-3895
Corporate Headquarters	Bob McGrath	512/699-7315

Datapoint has MANAGEMENT, MATURITY, AND MOMENTUM!

If you are unable to call, please send a letter outlining your education and experience to: Mr. Carl Sanchez, DATAPOINT CORPORATION, 9725 Datapoint Drive, Mail Station S7, San Antonio, Texas 78284.

We are an equal opportunity employer M/F.

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DATAPOINT CORPORATION

"The Leader in Communications Management." ™

PROGRAMMER/ANALYST

Indiana General, located in Valparaiso, has a career opportunity for a COBOL Programmer/Analyst. The position requires a minimum of 3 years experience, with a manufacturing background preferred. Additionally, on-line and/or data base experience would be helpful.

The position offers competitive compensation including a full range of fringe benefits. To apply, please submit resume including salary history to:

Jim Warheit,
INDIANA GENERAL
405 Elm St.
Valparaiso, Indiana 46383
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POSITION AVAILABLE

Systems Analyst - Permanent staff position with the National Center for State Courts with initial assignment on a major judicial information systems project. Will perform systems evaluation, technology comparisons, and other analytical tasks within the court environment. Will provide technical assistance to individual state courts and administrative offices. Position requires Bachelor's degree or higher; 3-8 years of systems analysis experience, preferably in judicial or criminal justice information systems; experience in systems design and documentation; and good oral and written communications skills, experience with various levels of judicial personnel highly desirable. Prefer applicants with consulting, research, or management experience in addition to court/criminal justice and systems experience. Salary range is $22,000 - $28,000. Please send resume to the **National Center for State Courts, Box NJS, 300 Newport Avenue, Williamsburg, Virginia 23185. EOE/MF**

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Has IMMEDIATE EMPLOYMENT for the following:

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- GCOS SYSTEMS PROGRAMMER - 7+ years COBOL programming experience with at least 5 years systems software GMAP programming on H-6000.
- DATABASE DESIGNER/ADMINISTRATION - 6+ years COBOL programming experience, with at least 2+ years IDS and DM-IV design experience.

We offer an excellent salary and benefit package, a challenging environment, advance based on proven ability.

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1815 N. Ft. Myer Drive
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Attn: Director of Personnel
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The Technical Services Division of Sperry Univac provides state-of-the-art systems design, applications analysis, programming and other software services to a wide range of customers.

The continuous growth of our technological capabilities and contract commitments have created immediate openings in our facilities in Virginia, Maryland and Pennsylvania. Technical areas include:

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Candidates should have a proficiency in ANY of the following areas:

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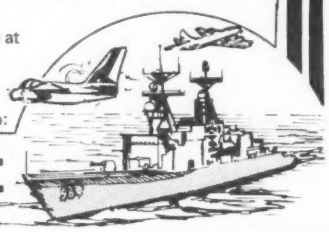

SPERRY UNIVAC

TECHNICAL SERVICES DIVISION
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COMPUTER SCIENTISTS

Senior Research Staff

The Information Sciences Company of Planning Research Corporation has immediate need for data processing professionals with superior technical qualifications and research expertise to join its Senior Research Staff. The SRS is an elite group of senior computer scientists who support ongoing projects in challenging problem areas and who plan and perform research and development activities designed to ensure PRC/ISC's position as an industry leader for years to come.

Qualified candidates will have excellent academic credentials and/or extensive practical experience in one or more of the following areas:

- **SYSTEM ARCHITECTURE**
- **DATA COMMUNICATION**
- **SOFTWARE ENGINEERING**
- **DATA BASE SYSTEMS**
- **MODELING AND SIMULATION**
- **SYSTEM SECURITY**
- **PATTERN RECOGNITION**
- **OPERATING SYSTEMS**

If you are qualified and wish to learn more about the challenge and the rewards (including an excellent compensation package) associated with membership in PRC/ISC's Senior Research Staff, please call Jim Paul, Director of Professional Resources, or submit your resume in confidence to his attention:

prc Planning Research Corporation
INFORMATION SCIENCES COMPANY
7600 Old Springhouse Road
McLean, Virginia 22102
(703) 893-1811

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DATA BASE ADMINISTRATION

Openings in established Data Base Administration Group, IMS db/dc environment, involved in control of the data resource for administrative information systems at the University of Illinois. Activities involve heavy consulting in on-line application development and data base design, control of data definition through data dictionary, control of integrity of data bases, installation of data bases and associated programs.

MANAGER

Management position responsible for the Data Base Administration Group and the above outlined duties. Minimum qualifications: five years experience in information systems including three years in application development or systems support using data base software and one year supervisory experience. Strong communication skills and Bachelor's Degree.

DATA BASE SPECIALIST

Provides support for data base activities as outlined above. Minimum qualifications: three years experience in information systems development including at least one year in IMS based systems and strong communication skills.

Liberal benefits including opportunity to continue education, one month's vacation, pleasant University community.
If you have an interest in this vital activity and appropriate background, send resume and salary history to:

UNIVERSITY OF ILLINOIS
Administrative Information Systems Development
409 East Chalmers, Room 213, Champaign, Illinois 61820

The University of Illinois is an Affirmative Action/Equal Opportunity Employer and encourages applications from members of minority groups and women.

DATA PROCESSING PROFESSIONALS

Wausau Homes a fast track panel constructed housing manufacturer located in a highly desirable central Wisconsin community has an opening for a Systems Analyst/Programmer in its dynamic Data Processing Department. RPG II System 3 background coupled with several years of manufacturing systems experience will qualify you for this position. Accounts receivable in payroll/personnel systems experience desirable but not essential.

In addition to an excellent career growth opportunity we offer salary commensurate with your background and experience and a comprehensive fringe benefits program.

If you possess the necessary background and would like to explore this opportunity send resume including salary history to:

Bill Stafford
WAUSAU HOMES, INC.
P.O. Box 1204
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Wausau Homes
Welcome Home.

CDC Technical Opportunities

Broadly diversified energy systems company, Combustion Engineering runs one of the most advanced computer and international data communications networks currently in operation. Our equipment includes a CDC 7600 and CYBER 172, both used to support engineering and scientific workloads.

SYSTEMS PROGRAMMER

Qualified candidates will have 2-5 years experience with CDC SCOPE or NOS Internals, including modifications and extensions to improve system capability and stability. Degree in Computer Science, Math or an exact science desirable.

TECHNICAL SPECIALIST Support Services

Responsibilities will include consulting, user education, documentation, programming and benchmarking of new hardware and software. Successful candidate will have 3+ years experience and considerable expertise in Control Data computers including competence with FORTRAN and BASIC (COBOL and/or APL a plus), a thorough knowledge of CDC Control language, utilities and familiarity with COMPASS, Systems Internals and/or data-base applications.

Located at our Windsor, Connecticut Data Center, these positions offer an excellent starting salary and a full range of benefits. For prompt, confidential consideration, forward your resume, including salary history and requirement, to: H.R. KAIN, COMBUSTION ENGINEERING, 200 Pigeon Hill Road, Windsor, Connecticut 06095.

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For professional and personal fulfillment, New England is where it's at. New England-rich in historic lore, educational and cultural facilities, major league sports, and year round natural recreational advantages. Check our outstanding EDP opportunities. Then come to New England . . . **and live!**

Below is a partial list of current openings:

SR. ANALYST-MAINE
State-of-the-art installation needs bus. analyst to design, code, & implement new commercial sys. IBM 370/158 MVS, COBOL. Interview & reloc. expense pd. **$21,000.**

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SR. SYSTEMS PROG.-MASS.
Multi-nat. electronics mfr. seeks creative software spec. exp'd. in IBM 370 OS/VS, MVS, HASP, DBMS concepts. Interview & reloc. expense pd. Leads to tech. mgr. **$28,000.**

PL-1 ANALYST-BOSTON
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100 Summer Street
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(617) 423-1200

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Live by and in the "Ocean State." Excellent firms seek DOS & OS exp. Banking, Insurance, Hospital & Mfg. areas. Salaries to **$25,000.**

EDP AUDITOR-R.I.
Aggressive R.I. Bank seeks state-of-the-art indiv. for highly technical environment. Audit DP installations & analyze systems development projects. IBM 370 COBOL/FORTRAN/PL-1. **$25,000.**

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"Fortune 100 Co." in little R.I. (so small, so easy to commute) seeks top EDP tecnician, IBM 3031 DOS/VS JCL RPG II & COBOL shop. Report to V.P. Be innovator/decision maker. **$23,000.**

PROGRAMMER/ANALYST R.I.
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(401) 274-8700

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Excellent oppty. for indiv. to take charge for CICS installation. Very visible position with State-Of-The-Art. **High $20's.**

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Conn. Corp. loc. beautiful shore line area expanding devel. div. COBOL trained indiv. with mgmt. potential can move into immed. new devel. projects leading to supvry. position in 1+ yr. **$24,000.**

SYSTEMS PROG.-VT.
Excellent oppty. in recreation, ski country for DOS/CICS Tech. Indiv. to support all software. Data Base, on-line systems pref'd. **$24,000.**

111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

Call or send resumes to Robert Half, Att: EDP Placement Manager, at any of the addresses above.

ROBERT HALF DATA PROCESSING SPECIALISTS

Robert Half, staffed by professionals for professionals, is the oldest and largest personnel consulting firm specializiang exclusively in Data Processing and Financial/Accounting Personnel, with 60 offices throughout U.S., Canada and Great Britain.

All fees are paid by client companies.

SYSTEMS ANALYST/PROGRAMMER

Deadline Extended

Oberlin College, a private liberal arts college with a FTE of 2700 students, located southwest of Cleveland, is seeking a Systems Analyst/Programmer.

The candidate must have a minimum of three years experience in programming and systems analysis. Systems experience should include responsibility for the development and installation of a major administrative system. The candidate must have highly developed communication skills, verbal and written, and must have written complex COBOL programs. The person selected will be exposed to all areas of administrative processing. A Bachelor's Degree, experience with financial applications, and previous systems experience in an academic environment are desirable. Salary range $14,910 - $22,370 plus liberal employee benefits. Starting salary dependent upon experience and qualifications. Interested persons should submit resume by June 29 to: **George Bosela, Director Systems Development/Programming, Oberlin College, Computing Center, Oberlin, Ohio 44074.** Position to be filled by August 15, 1979.

U.S. DEPARTMENT OF JUSTICE IMMIGRATION AND NATURALIZATION SERVICE (INS)

Computer Systems Analyst
(Mini-computer Systems Manager)
TWENTY-SIX LOCATIONS NATIONWIDE
GS-334 9/11/12/13 depending on location
$15,920 - $35,688 per annum
Further information is available on the Vacancy Announcement.

Expansion of Present Data Systems Activity in INS Nationwide Project

Distributed Data Systems Environment

Data Base Management Systems

Management of Mini-Computer System at Local Level

Analysis, Design and Implementation of New Systems

These Civil Service positions are being filled competitively under vacancy announcements available at any INS facility; by mailing an inquiry to Immigration and Naturalization Service, PO Box 2813, Washington, D.C. 20013 to be received no later than June 20, 1979; or by calling 202/633-5003. Mail completed announcements and appraisals as stated in vacancy announcement. Applications (SF-171) must be postmarked by June 25, 1979, in order to receive consideration.

EQUAL OPPORTUNITY EMPLOYER

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VOLT

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It's programming staff and is looking for
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Experienced with:
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Entry level positions are avail. Starting salaries up to $60K.

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SYSTEMS PROGRAMMERS

Salary area $25,000

You can spend your lunch hour strolling along one of the most beautiful beaches in Texas. Our client offers the qualified systems programmer a full benefits package as well as complete relocation costs and two months free rent to ease the strain of relocation. Requirements include experience on IBM 370 hardware and a strong ALC background.

For further information, please contact Roger Hall or Murl Webster at (713) 621-9050.

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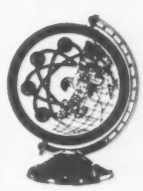
Data Processing

PROGRAMMERS



The Fermi National Accelerator Laboratory has several positions for programmers. You can become a part of one of the world's most exciting research projects – the operation of a giant proton synchrotron capable of accelerating protons to an energy of 400 billion electron volts. This synchrotron is opening the door to new horizons of research in the world of unseen particles and bringing new knowledge to scientists everywhere. In particular we are interested in the following:

Systems Programmer

To work on operating systems improvements and modifications for the CDC Cyber Systems. Requirements are 1 or more years experience working with the internals on the NOS or KRONOS operating system for Control Data Corporation 6000, Cyber 70s or Cyber 170s. The laboratory configuration includes 3 loosely coupled Cyber 175s.

Applications Programmer

To work on data base applications using System 2000 on the CDC Cyber 175. The requirements are 1 or more years experience designing and implementing data bases using System 2000. Other desirable experience is knowledge of Fortran and use of Control Data Corporation 6000, Cyber 70s or Cyber 170 computers.

Mini-Computer Programmer

This position requires mixes of both assembly language and higher level language programming on modern mini-computers for real time control and data acquisitions. We are also interested in applicants with data-taking experience as well as programming experience on mini-computers. Experience on PDP-11 computers would be especially valuable. A BS or MS degree in computer science or physics with electronic experience is desirable. Good communication skills and an ability to work with engineers and scientists is necessary.

We offer a competitive salary and a full range of fringe benefits. Please submit resume in confidence, including salary history to:

James C. Lasenby
FERMI NATIONAL ACCELERATOR LABORATORY
P. O. Box 500
Batavia, IL 60510
(312) 840-3324

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Data Processing

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Attn: Computer & Office Systems Expo Manager.

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We are a national management consulting group that is experiencing continued growth throughout our offices in the U.S. We are building a solid team of EDP Professionals to service the consulting needs of our large domestic client base. Positions are available in Cincinnati, Cleveland, Detroit, Louisville, Minneapolis, Toledo, Milwaukee and Chicago for individuals who have the capability to assume project management roles and work with client management in a variety of challening assignments.

We are looking for people with demonstrated academic excellence with a strong technical background and have at least 3 years direct data processing experience in the design and implementation of medium to large scale computer applications. A business background that includes manufacturing and financial/accounting applications is preferred. Ability to communicate clearly is essential.

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Initiative and experience are the primary requisites for these challenging and rewarding positions.

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Call John C. McCarthy collect at (617) 258-2678. Or send your resume to his attention at The Charles Stark Draper Laboratory, Inc., 555 Technology Square, Cambridge, MA 02139.

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Generate and maintain computer operating systems, implement packaged software, monitor hardware performance, manage disc and optimize operations. Provide technical assistance to engineers, programmers and analysts. Supervise computer operations. We require a degree in science or engineering with 4-6 years experience in computer systems.

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COMPUTER SCIENCE FACULTY: Midwestern State University seeks applicants for a position in its Computer Science program for the academic year 1979-80. Applicants must possess Ph.D. or be ABD in Computer Science or appropriately related field. Selected individual will have opportunity for tenure track appointment after one year. The MSU Computer Science program offers the bachelor's degree with emphasis in applications to business and scientific problems. Please send resume by July 15, 1979 to:

Dr. Louie C. Huffman
Chairman,
Mathematical Sciences
Midwestern State University
Wichita Falls, Texas 76308
(817) 692-6611, Ext. 262

PROGRAMMER

South Jersey mfgr. is seeking a programmer with 3-5 yrs. mfgr. exp. in CICS, Cobol lang. utilizing 370 IBM equip. Assume total programming respon. for codes, preparing test data, tests, debugging programs and documentation of all proced., etc. Knowledge of mfgr. and acct'g. programming, a must. Send resume w/salary req. to: P.O. Box 308, Bellmawr, New Jersey, 08031, an EOE.

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For a detailed briefing on your future at NCR, and a description of our comprehensive benefits package which includes generous relocation assistance to a fine, well-balanced community, call Tom Snow toll free at: 800-543-2386. In Ohio, call him collect at (513) 449-4150.

Or send your resume and salary history, in complete confidence, to him at: USDPG, NCR Corporation, Dept. H-50 Dayton, Ohio 45479.

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data processing

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Progressive recreation product manufacturer has immediate opening for individual proficient in COBOL, RPG and assembler languages using CICS DL/1 and DOS/VS software on an IBM 370/138 with VSAM and ISAM I/O technique. Applicants with experience in manufacturing systems, generation and/or maintenance of IBM operating systems, software and teleprocessing systems with a B.S. degree are preferred. For consideration, send a resume and salary history to:

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Following positions are with a Cincinnati-based corporation for those seeking career opportunities with:

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Federated Department Stores, Inc., a national leader in retailing, has a major systems development program in progress that is committed to developing advanced business systems incorporating data base and data communications capabilities.

Advanced technologies include:

- **IMS/DB ... IMS/DC**

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If your background includes solid COBOL programming experience on large IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment working with the latest technological concepts, then send your resume, including salary history, or call in confidence to: Mr. Jack Phillips (513) 852-3516 or Mr. Jerry Rouse (513) 852-6613.

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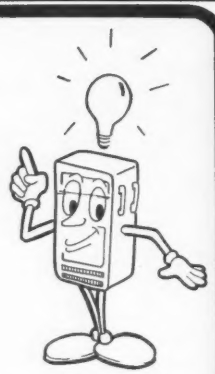

Bright Futures with Southern California Edison

Your future with SCE could be bright in many ways. Southern California Edison is one the nation's leaders in energy production, and its rapidly expanding Data Processing Center is on the leading edge of the indusiry. Because of this rapid expansion, we have immediate openings for experienced Programmers and Analysts. If you are looking for a bright future with a leading company in sunny Southern California, consider SCE.

The individuals we are seeking should have 3-5 years of experience in COBOL programming, with IBM hardware/software on large scale system development projects. We also need systems programmers with IBM internals experience.

In return for your skills, Southern California Edison has the following to offer you.

HARDWARE - 3 IBM 370 168's (to be replaced by 3 IBM 3033's) plus an 850 TERMINAL SNA NETWORK

SOFTWARE - COBOL, MARK IV, MVS, CICS, NCP, VTAM, VSAM, IMS.

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SALARY - Exceptionally competitive! Salaries and advancements based solely on performance.

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MYER

AUSTRALIAN COMPUTER OPPORTUNITIES

THE MYER EMPORIUM LTD. Australia's largest Department Store Group and one of the World's largest retailing organisations have commenced what is the most exciting and significant Data Processing project in Australia today. It is envisaged that a new NATIONAL COMMUNICATIONS NETWORK, incorporating the Point of Sale, will be developed needing the latest "State of the Art" technology. A study has been initiated to establish the requirements of the new System, the STRATEGIC DESIGN and the STRATEGIC PLAN.

Several key people are needed NOW to participate in the study and then take part in the design, development and implementation. Location will be at the Corporate Head Office of Myer in Melbourne. Currently Myer operate a mix of IBM mainframes and NCR/POS terminals across Australia.

COMPANY INFORMATION:
The Myer Emporium was established in 1905 and currently employs 29,000 people in 122 stores and locations. The company is comprised of four profit centres:

- Myer Department Stores
- Target Australia mass merchandising division
- Target Supermarkets food chain
- Myer Shopping Centres Property development division.

Their revenue for 1978 was $US1.31 billion with planned annual revenue increases hence the need to greatly increase their Information Processing capabilities.

ABOUT MELBOURNE, AUSTRALIA:
Melbourne is the second largest capital city in Australia renowned for its sophistication, corporate headquarters, superb restaurants, cultural centre and also being the capital of Australian football. It is built on a beautiful bay offering superb boating.

Positions Available

SYSTEMS DEVELOPMENT MANAGER
Reporting directly to the Manager of Corporate Information Services. The successful person will plan, lead and control a large team (around 80) D.P. professionals. It is expected the person will have a minimum of 12 years D.P. experience and currently be in a senior position.

Because of the scope of the project a complete understanding of Systems Development Methodology will be needed together with current knowledge of Data Communications and Data Base design. A successful Management record is a pre-requisite, considering the importance of the Development to the MYER Group of companies. Retail and translocation experience would make the person ideal.

Remuneration will be by way of a package comprising a salary, company car, executive benefits and it is thought that $US60,000 should be taken as a guide. All relocation costs will be paid to Melbourne.

TECHNICAL SERVICES MANAGER
This position also reports directly to the Manager of Corporate Information Services. This is a unique opportunity for a person with experience and a sound working knowledge of Network Engineering, Hardware and Systems Software Support and Maintenance, Research and Development, to obtain the type of career position that many only dream about.

The successful appointee must take full responsibility for designing and implementing a Nationwide mixed supplier Data Communications Network, plus Design/Evaluation/Selection of Systems Software.

An exciting function of this position will be the Research and Development of new Hardware and Software announcements in order to appreciate the impact of the Strategic Design. Apart from a high technical capability a strong management track record is essential. Knowledge of MVS and IMS will be imperative.

Remuneration will be by way of a generous salary plus a company car and executive benefits, but $US45,000 should be taken as a guide. Relocation costs will be paid to Melbourne.

DATA BASE SPECIALIST
The Myer Information Services Group also need people who have designed, developed and implemented substantial IMS Data-Bases. These people will take primary roles in Designing, Developing and Implementing the Myer Data-Base. The opportunity offered here is unparalleled in Australia.

Remuneration will be by way of a generous salary plus executive benefits, however $US33,000 should be taken as a guide.

PROJECT TEAMS
As the strategic plan is developed a large number of D.P. professionals will be offered, technically and financially rewarding career positions as Analysts, Programmers, Network Engineers, On-Line Specialists etc. If you have in excess of five years recent practical experience with Retail and Commercial applications, On-line/D.B. commercial applications, IMS-MVS-OS/VS II Systems Software then you should apply now.

ACTION
Battles and Associates of Sydney, Recruitment Consultants since 1971, have been appointed International Search Consultants for the Myer Emporium.

The Joint Managing Director of Battles and Associates, Kevin D. Howard, will be in the United States and Canada, during the month of June. He will be attending the N.C.C. staying at the Americana Hotel (Telephone 212 581 1000) and welcomes calls from those people who are genuinely interested and have the experience and a true desire to emigrate to Australia.

All written replies should be directed as quickly as possible to our respected Associate Company in the U.S., the Bryant Bureau, who will then coordinate interview times. Address all mail to:

Kevin D. Howard
BRYANT BUREAU
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John Hancock Tower
200 Clarendon Street,
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BATTLES

APPLICATIONS PROGRAMMER

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EqOp Emplr M/F

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Responsibilities: Includes management of all phases of new information systems development from proposal to programming for the University's Systemwide Management Team. Includes coordination with campus systems development efforts. Planning and budgeting for corporate systems staff, hardware and software will be a major responsibility for this manager.

Current Salary Range: $23,500-$33,100. Range anticipated to be increased effective July 1, 1979. Level of appointment within salary range based on qualifications. Benefits are generous including 5 weeks annual vacation.

We require broad and successful information systems project management experience in a large organization. Ability to communicate well is essential. We prefer a MBA or equivalent, plus 5-7 years systems development experience.

Closing Date: July 16, 1979. Send resume to Edna Coleman, Employment Representative, 41-MCS University Hall, University of California, Berkeley, California 94720.

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ANALYST/PROGRAMMERS

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DESCRIPTION OF POSITIONS:
These positions involve complex, creative professional programming and/or EDP systems development. The successful applicant will become part of an informal but professional systems and programming department. Some of the tools and techniques used in this environment are structured programming, top-down development, product inspections by peers and structured analysis/design. Most new development is being done in the context of an overall plan for a university-wide student information system supported by an advanced CODASYL-based database management system. All positions require sound technical background and skills. Most require demonstrated ability in solving programming or systems problems; all require strong communications skills.

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RPG II/CCP	**22K**
IMS	**25K**
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All responses held strictly confidential. Serious inquiries only.

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Please send resume with salary history to A. Burkhartsmeier, Midland Federal Computer Center, 5680 S. Syracuse Circle, Englewood, CO 80111, or call (303) 779-5263. Equal Opportunity Employer M/F.

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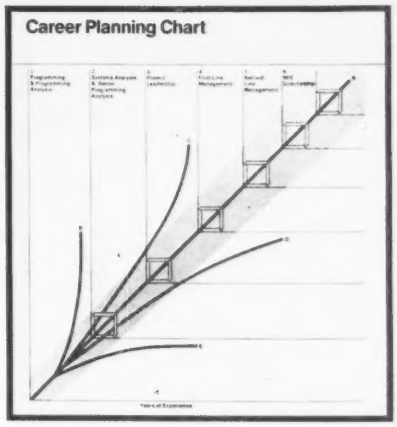

Here's important good news for men and women at all levels in the computer field. Source Edp's latest national survey indicates that, overall, EDP salaries have increased significantly over last year—in some categories by more than 15%.

This comprehensive and up-to-date study was compiled by Source Edp—North America's largest recruiting firm devoted exclusively to the computer profession. It's "must" reading for anyone in the field.

You are invited to telephone Source Edp to receive a free copy of this new report so that you can make sure that your salary has kept pace with other professionals with similar responsibilites and experience.

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Chapters include "The Career Planning Cycle", "The EDP Structure—A Look Ahead", and "Strategy for Career Development"...plus a chart on career planning which shows when a job change may be advisable.

Phone for your free copy today, without cost or obligation. It could lead to important and profitable new "breakthroughs" for you in advancing your career.

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Wellesley MA	617/237-3120	Englewood CO	303/773-3700
Hartford	203/522-6590	Fort Worth	817/338-9300
New York	212/736-7445	Greensboro NC	919/294-6550
Long Island	516/222-2616	Houston	713/626-8705
White Plains NY	914/683-9300	New Orleans	504/561-6000
Paramus NJ	201/265-7456	Phoenix	602/258-9333
Philadelphia	215/665-1717	San Antonio	512/344-0217
Valley Forge PA	215/265-7250	**West Coast**	
Stratford CT	203/375-7240	Los Angeles	213/386-5500
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Washington DC	703/790-5610	Irvine CA	714/833-1730
Midwest		Torrance CA	213/540-7500
Chicago	312/782-0857	Palo Alto	415/856-0600
Northfield IL	312/446-8395	Portland OR	503/223-6160
Oak Brook IL	312/986-0422	San Diego	714/231-1900
Rolling Meadows IL	312/392-0244	San Francisco	415/434-2410
Cincinnati	513/769-5080	Seattle	206/454-6400
Cleveland	216/771-2070	**Canada**	
Detroit	313/963-0510	Toronto	416/364-2919
Southfield MI	313/352-6520		
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Milwaukee	414/277-0345		
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If unable to call, write:
Source Edp, Department CA
721 Enterprise
Oak Brook, Illinois 60521
(When writing, please be sure to indicate home address and current position title.)

SALES

District Sales Manager

Excellent opportunity for experienced OEM District Sales Manager to handle Southwestern territory for major West Coast computer peripheral manufacturer. Residence in Dallas required.

Must have sales background and technical knowledge of printers and terminals, with proven record of successful career growth.

Please send your resume in confidence to:

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Regional Manager
TALLY Corporation
890 East Higgins Road, Suite 149
Schaumburg, Ill 60195
(312) 885-3678

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TALLY

SYSTEMS ANALYST/ PROGRAMMER

Responsible for design, development, support applications and system software on HP3000. Also developing on-line real time applications and conversion of existing applications on Data Point equipment to HP3000. Salary commensurate with experience. **Contact: Personnel Department, Sutter Community Hospitals, 2820 L Street, Sacramento, CA 95816, (916) 454-2222, Ext. 1540.**

FACULTY POSITION

A tenure-track position is available September 1979. Candidates must have a Ph.D. or ABD status in computer science or closely related field with a strong background in data base management, systems programming or programming languages. Responsibilities: undergraduate teaching, counselling, and curriculum development. Salary 14 to 16K for nine months. Part time teaching likely during the summer session. Affirmative action/equal opportunity.

Write John O'Neill
Mathematical Sciences
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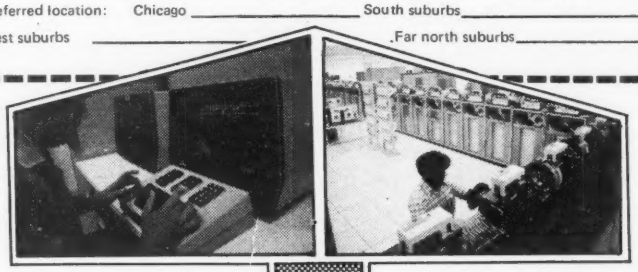

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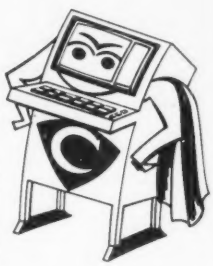

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If you are a data processing professional seeking a challenge in interactive computing this is an exceptional opportunity for you to join our regional staff based in Rockford. Some travel will be required to provide support to our various Newspaper installations in the midwest.

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Systems support software responsibilities include maintenance, enhancement, design and development. Must possess a strong language background and familiarity with Burroughs large systems a plus. Consultation and presentation of technical seminars will also be involved.

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Research and analyze technical data processing information, write and edit data processing standards and procedures, produce and distribute technical publications and audit existing publications and monitor usage.

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Ideal candidate will have a minimum of 1 year prior experience on Burroughs 67/7700 or 4700 to operate our computers.

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Individual will identify problems and develop solutions to improve the effectiveness of applications systems. Responsibilities include execution of performance audits, design and implementation of system improvements and direction of the programming staff in its implementation activities. Minimum 3 years exposure to COBOL applications required including familiarity with business applications of order entry, marketing, inventory, financial and/or manufacturing.

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(800) 528-6050, Ext. 1263

If you prefer to fill out this resume update, we will contact you.

American Hospital Supply Corporation

AHSC

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Preference given to candidates with experience on mini computers (PDP, Data General, etc.) in Assembler language. Other experience considered.

SYSTEMS ANALYST

Requires a minimum of 4 years DP experience of which 2 should be as a Systems Analyst. Heavy exposure to interactive applications necessary with strong FORTRAN background and manufacturing applications experience highly desirable.

Send resume including CURRENT SALARY to:

RECRUITING COORDINATOR
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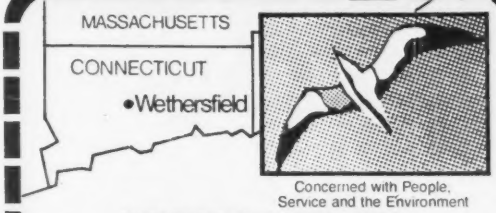

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The American Red Cross Blood Services–Northeast Region

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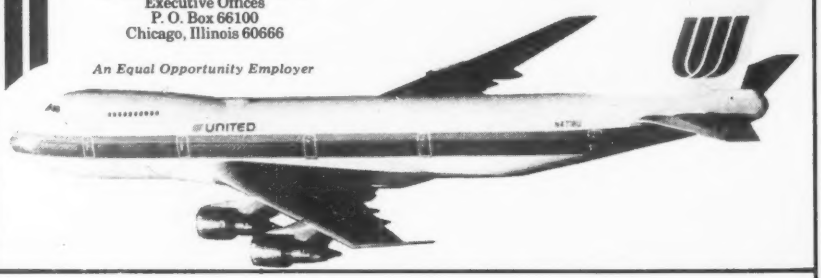

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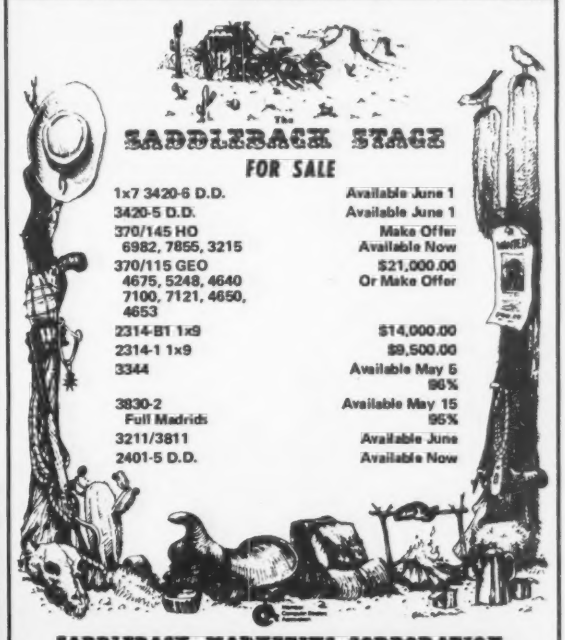

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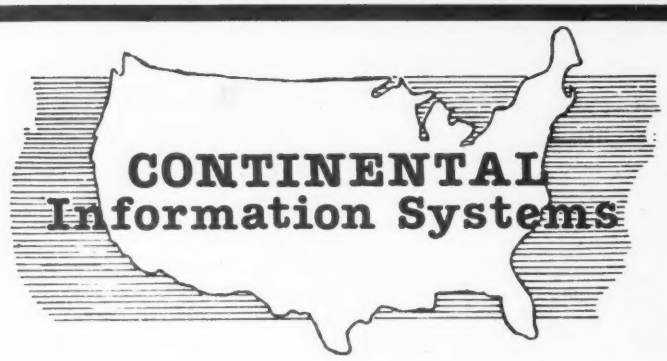

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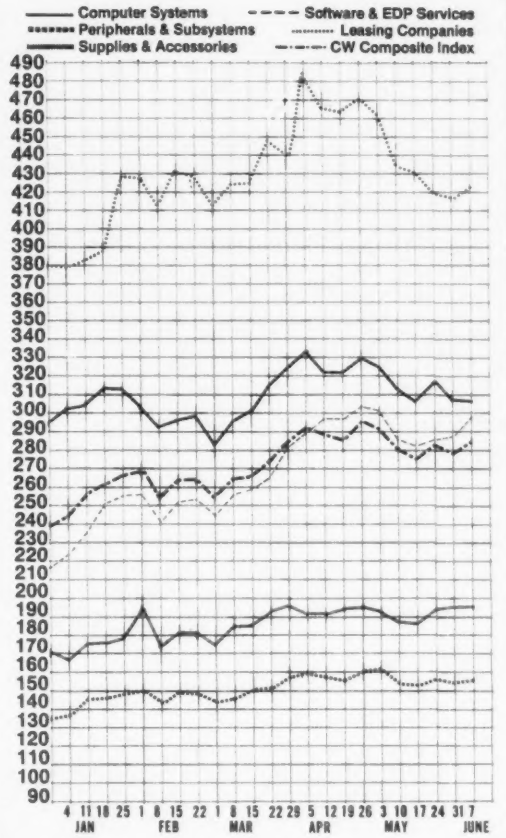

Earnings Reports

MCI COMMUNICATIONS
Year Ended March 31

	1979	1978
Shr Ernd	$.23	$.23
Revenue	95,243,000	74,049,000
Tax Cred	3,541,000	690,000
Earnings	7,076,000	5,190,000
3 Mo Shr	.06	.03
Revenue	27,347,000	19,538,000
Tax Cred	1,319,000	368,000
Earnings	2,787,000	837,000

MSI DATA
Year Ended March 31

	a1979	1978
Shr Ernd	$1.86	$1.80
Revenue	43,222,000	38,874,000
Spec Cred	b470,000	....
Earnings	3,639,000	3,654,000
3 Mo Shr	.55	.48
Revenue	13,640,000	10,448,000
Spec Cred	b131,000	....
Earnings	1,148,000	989,000

a-For 53 weeks and 14 weeks. b-From appreciation of value of 300,000 shares of Western Digital Corp. common stock which was acquired as a result of the settlement of a damage claim.

PERKIN-ELMER
Three Months Ended April 30

	1979	1978
Shr Ernd	$.67	$.49
Revenue	189,207,000	a150,620,000
Earnings	13,233,000	9,471,000
9 Mo Shr	1.76	1.14
Revenue	518,448,000	a403,428,000
Earnings	34,854,000	22,265,000

a-Restated.

RECOGNITION EQUIPMENT
Three Months Ended April 30

	1979	1978
Shr Ernd	$.08	$.27
Revenue	22,650,000	22,696,000
Tax Cred	....	438,000
Earnings	394,000	1,601,000
6 Mo Shr	.37	.48
Revenue	47,568,000	40,426,000
Tax Cred	540,000	815,000
Earnings	2,230,000	2,840,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 6, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE JUNE 6 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	ANDAHL CORP	28- 69	38 1/2	+ 1/2	+1.3
N	BURROUGHS CORP	59- 87	70 3/8	+1 5/8	+2.3
O	COMPUTER AUTOMATION	15- 44	18	+ 1/2	+2.8
N	CONTROL DATA CORP	23- 44	38 1/8	+2	+5.5
O	CRAY RESEARCH INC	8- 36	36	+5	+16.1
N	DATA GENERAL CORP	42- 73	67 1/2	+ 7/8	+1.3
N	DATAPOINT CORP	34- 82	77 3/4	+ 3/4	+0.9
N	DIGITAL EQUIPMENT	39- 58	54 1/8	+1 3/4	+3.3
N	ELECTRONIC ASSOC.	2- 13	7 1/8	- 1/8	-1.7
A	ELECTRONIC ENGINEER.	9- 19	11 1/8	- 5/8	-5.3
N	FOUR-PHASE SYSTEMS	19- 46	34 1/4	+ 1/2	+1.4
N	FOXBORO	28- 40	35 7/8	+ 1/8	+0.3
O	GENERAL AUTOMATION	7- 26	12 7/8	- 1/4	-1.9
O	GRI COMPUTER CORP	1- 3	1 3/8	- 1/8	-8.3
N	HEWLETT-PACKARD CO	62- 97	95 1/2	+ 7/8	+0.9
N	HONEYWELL INC	43- 76	67 7/8	+ 3/4	+1.1
N	IBM	76-321	77 1/2	226 1/8	-74.4
O	MANAGEMENT ASSIST	9- 29	18 1/2	-1 1/2	-7.5
O	MANUFACTURING DATA S	9- 25	22 7/8	+ 1/2	+2.2
O	MICRODATA CORP	10- 24	23 3/4	+6 3/4	+39.7
O	MINI-COMPUTER SYST	4- 8	5	+ 1/4	+5.2
O	MODULAR COMPUTER SYS	7- 18	12	+ 1/2	+4.3
N	NCR	37- 72	67 3/8	0	0.0
N	PRIME COMPUTER INC	20- 43	35 3/8	+1	+2.9
N	PERKIN-ELMER	17- 34	29 3/4	+ 5/8	+2.1
N	SPERRY RAND	33- 51	45 7/8	+1 1/4	+2.8
A	SYSTEMS ENG. LABS	11- 24	12 5/8	+ 1/8	+1.0
O	TANDEM COMPUTERS INC	13- 37	30 1/2	+ 1/2	+1.6
A	WANG LABS.	12- 43	37 1/8	+1 3/4	+4.9
	LEASING COMPANIES				
C	BOOTHE COURIER CORP	13- 21	17 3/4	+1	+5.9
C	COMDISCO INC	3- 21	16 3/4	0	0.0
A	COMMERCE GROUP CORP	1- 1	1/2	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 3/8	+ 1/8	+3.8
C	CONTINENTAL INFO SYS	5- 15	6	- 1/4	-4.0
M	DATRONIC RENTAL	1- 4	3	- 1/8	-4.0
A	DCL INC	3- 5	5 1/8	- 1/8	-2.3
N	DPF INC	8- 14	10 7/8	- 1/8	-1.1
N	ITEL	12- 36	12	-1 1/4	-9.4
N	LEASCO CORP	24- 43	40 1/4	- 3/4	-1.8
O	LEASPAC CORP	1- 4	5/8	+ 1/8	+25.0
A	PIONEER TEX CORP	3- 7	3 1/4	0	0.0
N	U.S. LEASING	13- 20	14 7/8	+ 1/8	+0.8
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 5/8	+ 1/8	+8.3
O	ANACOMP INC	8- 22	16 3/8	+1 1/8	+7.3
A	APPLIED DATA RES.	8- 17	10 1/8	+1 1/8	+12.5
N	AUTOMATIC DATA PROC	24- 36	34	+1 1/2	+4.6
O	COMPU-SERV NETWORK	5- 16	14 3/4	+1 1/2	+11.3
C	COMPUTER HORIZONS	1- 9	5 1/4	0	0.0
G	COMPUTER NETWORK	5- 16	6 1/2	- 1/4	-3.7
N	COMPUTER SCIENCES	8- 17	11 1/8	+ 1/2	+4.7
O	COMPUTER TASK GROUP	1- 7	7	+ 1/4	+3.7
O	COMPUTER USAGE	2- 4	2 1/4	+ 1/8	+5.8
O	COMPUT AUTO REP SVC	4- 10	7 3/8	+ 1/8	+1.7
C	COMSHARE	6- 26	24	+1 1/4	+5.4
O	CULLINANE CORP	14- 33	20 1/4	+1 1/2	+8.0
O	DATA DIMENSIONS INC	3- 9	2 3/4	0	0.0
O	DATATAB	1- 4	3	0	0.0
N	ELECTRONIC DATA SYS.	15- 25	23	+2	+9.5
O	INSYTE CORP	1- 3	1 1/4	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	0	0.0
O	KEANE ASSOCIATES	3- 6	5 1/4	+ 1/4	+5.0
O	KEYDATA CORP	1- 4	3 5/8	+ 1/4	+7.4
A	LOGICON	10- 19	14 3/8	+1 3/8	+10.5
A	NATIONAL CSS INC	15- 48	47 3/4	- 1/8	-0.2
O	NATIONAL DATA CORP	7- 13	11 1/8	+ 1/8	+1.1
A	ON LINE SYSTEMS INC	12- 30	20 5/8	+ 5/8	+3.1
N	PLANNING RESEARCH	4- 10	6	+ 1/4	+4.3
O	PROGRAMMING & SYS	1- 1	1 1/4	- 1/8	-9.0
O	RAPIDATA INC	3- 7	6 7/8	+ 1/4	+3.7
C	REYNOLDS & REYNOLD	10- 35	28 1/2	- 1/4	-0.8
O	SCIENTIFIC COMPUTERS	3- 9	7 3/8	+ 1/8	+1.7
N	TYMSHARE INC	18- 41	39 1/8	+2 3/8	+6.4
A	URS SYSTEMS	5- 8	5 1/2	0	0.0
N	WYLY CORP	1- 7	6 3/8	+ 1/8	+2.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	13- 32	13 1/4	- 7/8	-6.1
N	AMPEX CORP	10- 19	15 1/4	+ 3/8	+2.5
O	ANDERSON JACOBSON	5- 10	7 1/8	- 3/8	-5.0
N	APPLIED DIG DATA SYS	6- 22	9	+ 5/8	+7.4
O	BEEHIVE INT'L	3- 7	4	- 1/8	-3.0
A	BOLT,BERANEK & NEW	6- 14	12 1/4	+ 1/8	+1.0
N	BUNKER-RAMO	10- 29	28 1/8	+ 3/8	+1.3
A	CALCOMP	3- 13	11 7/8	0	0.0
O	CAMBRIDGE MEMORIES	3- 9	2 3/4	0	0.0
N	CENTRONICS DATA COMP	16- 46	41 5/8	-1 7/8	-4.3
C	COGNITRONICS	1- 4	2 1/8	- 1/8	-5.5
O	COMPUTER COMMUN.	6- 10	9 1/8	+1 1/8	+14.0
O	COMPUTER CONSOLES	4- 14	12 3/4	0	0.0
A	COMPUTER EQUIPMENT	3- 6	4 3/4	- 1/8	-2.5
O	COMPUTER TRANSCEIVER	1- 5	2 7/8	0	0.0
O	COMPUTERVISION CORP	9- 61	59 5/8	+3	+5.2
O	COMTEN	9- 38	25 1/4	+ 1/4	+1.0
N	CONRAC CORP	13- 26	15	+ 7/8	+6.1
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 11	9	- 3/8	-4.0
O	BALTIMORE BUS FORMS	1- 4	1	0	0.0
N	BARRY WRIGHT	14- 34	16 3/4	- 3/8	-2.1
C	CYBERMATICS INC	1- 1	3/4	0	0.0
C	DUPLEX PRODUCTS INC	13- 30	19 1/2	+ 1/2	+2.6
N	ENNIS BUS. FORMS	8- 23	22	- 3/4	-3.2
N	3M COMPANY	43- 66	56 5/8	+ 5/8	+1.1
C	MOORE CORP LTD	26- 34	33 1/4	+ 3/8	+1.1
N	NASHUA CORP	18- 37	21 7/8	- 1/4	-1.1
O	STANDARD REGISTER	20- 27	25 3/4	+ 1/4	+0.9
A	TAB PRODUCTS CO	8- 16	15 3/4	+ 5/8	+4.1
A	WABASH MAGNETICS	10- 22	16 1/8	- 1/2	-3.0
N	WALLACE BUS FORMS	18- 33	24 1/2	+ 7/8	+3.7

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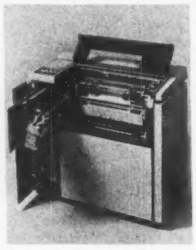

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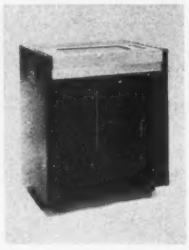

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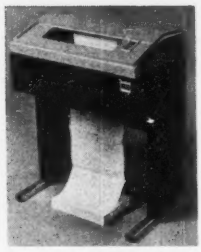

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